THE JOURNAL of the Oklahoma State Medical Association

VOLUME XI MUSKOGEE, OKLA., FEBRUARY, 1918 NUMBER 2

ACIDOSIS AND RECENT METHODS OF DEMONSTRATING IT*

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The interest and study that has been centered upon acidosis during the past three years has been demonstrated, among other things, that it is an extremely common condition. Physiologically it follows violent exercise, or the sudden exposure to an atmosphere low in oxygen, as on a mountain top. Probably in most of our common diseases the severity, at least, is dependent more or less upon the degree of acidosis present.

Definition. Acidosis may be defined as a condition in which there is an increase above the normal of any of the acid elements of the blood, owing to an excessive production of acid products of metabolism; or, to a defective elimination of the same; or both.

In acidosis it is not meant that the reaction of the blood actually changes from the slightly alkaline, or neutral, reaction to acid reaction. Only in the very last stages of acidosis, just prior to death, does an acid condition of the blood occur and under no other circumstances. Any increase in the acid phosphate, or in the organic acids of the blood is, within certain limits, very promptly and completely compensated by a loss of CO_2 through the lungs. The term acidosis, then, implies only that the non-volatile acids (usually acid phosphates or organic acids) are increased, while the bicarbonate and carbonic acid are in compensation reduced.

D. D. Van Slyke[1] defines acidosis as "a condition in which the concentration of bicarbonate in the blood is reduced below the normal level." Naunyn (1906) first used the term "acidosis" to denote the abnormal metabolic condition in which hydroxy-butyric acid is formed. The departure from this use has been evolutionary. Apparently because the word acidosis is suggestive of acids in general rather than hydroxy-butyric in particular, when other types of acid intoxication were discovered they also were designated as acidosis. Henderson[2] and his associates have been mainly responsible for the broader conception of the term.

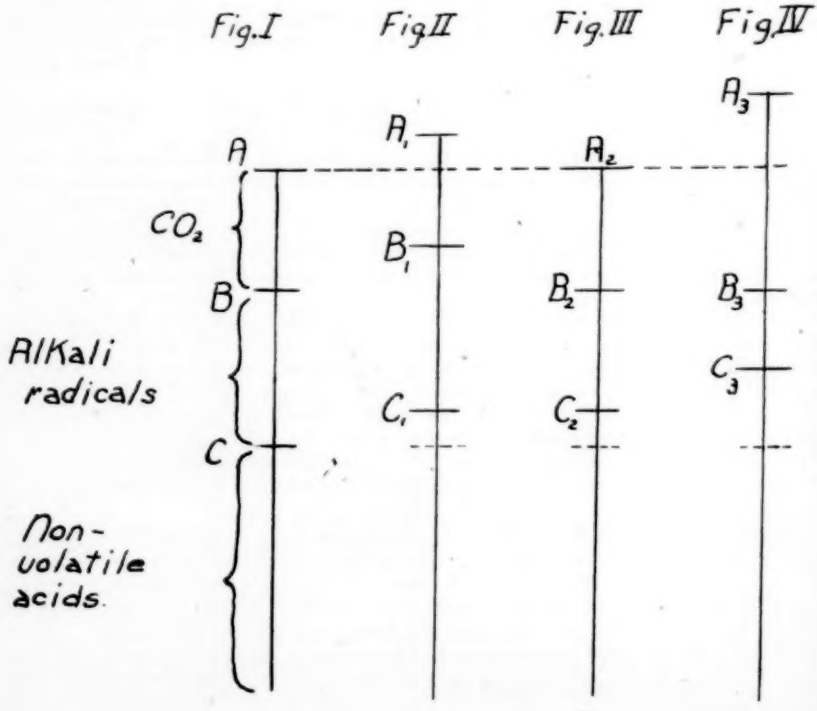
Physiology of Acid Regulation. In order that we may more fully understand the nature of acidosis, let us look for a moment into the physiology concerned. First the blood and in fact the whole body mass of tissue is maintained at a constant chemical reaction. Second, the respiration is a ready and prompt means of adjusting any changes in the constant chemical reaction of the body. Third, the kidneys are another means, though acting slower, in accomplishing this same

* Read before St. Anthony Clinical Society, Nov. 19, 1917.

purpose. Thanks mainly to the works of L. J. Henderson[2] we now know the physical chemistry of the mechanism for the adjustment of the chemical reaction of the blood. The blood is conceived of as a delicately balanced complex of chemical radicals, all appropriately ionized. The alkaline radicals are mainly those of K., Na., Ca., Mg. and NH_4; and the acid radicals are the chlorides, sulphates, phosphates and some other mineral acids, carbonates, carbonic acid and various organic acids, such as lactic, B-hydroxy-butyric, diacetic, etc. Of these salts which affect the reaction of the blood, the phosphates (Na_3PO_4, HNa_2PO4, H_2NaPO_4), carbonates (Na_2CO_3, $HNaCO_3$) and free carbonic acid are not only present in the greatest amounts but are so much the most important that no great error is involved in looking upon the blood as a solution of these salts alone. Due to the low degree of ionization of these radicals, a considerable number of acid free ions are capable of being bound without great change in the reaction being brought about. This, together with the proteins which also take up excess ions readily, endows the solution with the power, as it were, of soaking up the excess H-ions; it acts as a sponge, or as Henderson has so aptly termed it, as a "buffer."

The addition of acid to this complex results in a shifting of all the members present; some of the alkaline phosphate becomes acid-phosphate and at the same time carbonates become bi-carbonates; and some of the bi-carbonate loses its alkali and becomes carbonic acid. As a net result of this shifting all along the line there is, temporarily, more free CO_2 dissolved in the blood. This increased CO_2 stimulates the respiratory center with increased ventilation, and the extra CO_2 which has been formed is almost immediately washed out through the lungs and the reaction reduced to normal.

The mechanism may be illustrated roughly by a diagram[3] which, of course, must not be taken too literately as an exact representation of chemical facts.



In Fig. I, let A-B represent the dissolved CO_2, or the divalent CO_3 ion. B-C represents the alkali radicals and the line below C the phosphates and all other acid radicals. Everything else being equal, these quantities will be proportional according to physico-chemical laws, which have been so admirably explained by Henderson. A change in one quantity will bring about a change in all. Thus, if there is added an acid, such as lactic, (Fig. II) the line C will rise to C1, and A will rise to A1, with a corresponding shortening of B1-C1. This increase in the amount of acids above the normal stimulates the respiratory center and the excess of CO_2 is quickly removed, bringing the line A1 back to its normal level A, or nearly so. As the excess of CO_2 is eliminated, there is a further interchange of H-ion from the phosphates toward the carbonates and the level of B1 will be correspondingly lowered. Any such condition as Fig. II is unstable and necessarily hardly occurs at all. since the increase of acid takes place gradually and the excretion of CO_2 so fully compensates it that the line A never rises appreciably above its normal level.

Fig. III represents the ordinary condition of acidosis. At this time the kidney begins to work overtime in its attempt to keep the non-volatile acids at the constant level C, so that within an hour or two enough acid phosphate, or other acid, will have been excreted in the urine to bring the line C2 back to the normal threshold of C (assuming of course that the addition of acid does not continue), and at the same time A2 and B2 will return to their normal level.

The importance of the singular power of the kidney of withdrawing the acid radicals from an alkaline medium and excreting them in acid urine, and the rapidity and delicacy of this function, has only lately been realized. The radicals withdrawn consist mainly of the acid phosphates, although if the acid production of the body is low, the alkaline phosphates and even bicarbonate will appear and the urine will become alkaline. Thus the kindey maintains a threshold value for acids above which acids ions will be excreted; and below which, in a similar manner, enough alkali will be excreted to keep constant the nornmal reaction of the blood. Although this level varies slightly between individuals, it remains remarkably constant in the same person. Also the total acid and therefore the amount of dissolved CO_2 remains constant in the same subject over many years.

The amount of alkali radicals which are available to neutralize acid (that is the tri- and di-sodium phosphates and the carbonates) is termed the "alkali reserve." The line BC in Fig. I represents this value.

Of course there is a limit to power of this respiratory and renal compensatory mechanism. Figures II-III represent a compensated acidosis. Fig. IV represents a condition which occurs only in the more extreme forms of acidosis (usually near death), where the level of C3 has become so high and B3-C3 (alkali reserve) so decreased that the most energetic breathing, or the most frantic efforts of the kidneys, cannot keep the total acid at normal level.

In the case of the blood it is mainly the salts of carbonic acid and partly the proteins rather than the salts of the phosphoric acid that furnishes the "buffer." Free carbonic acid is present in the body fluids in such concentration that it automatically converts into bicarbonate all bases not bound by other acids. The bicarbonate, therefore, represents the excess of base which is left after all the non-volatile acids have been neutralized. In this sense it constitutes the "alkali reserve" of the body. Entrance of free acid into the blood reduces the bicarbonate to an extent proportional to the amount of the invading acid. The retained acid decomposes body bicarbonate, forming in its place the salts of the invading acid.

The normal concentration of the bicarbonate in the blood is so definite that it constitutes a physiological constant. The blood plasma of normal adults

contains 55 to 77 per cent of its volume of CO_2 gas bound as bicarbonate. The limits of variation are similar in magnitude to those of the pulse rate. By utilizing as a standard the normal bicarbonate concentration, we can reduce the term "acidosis" to as definite a meaning as fever, or "tachycardia." In each case condition is indicated in which one of the physiological constants falls, or rises, to abnormal level. Like accelerated pulse rate, or increased temperature, it may occur temporarily even in health, e. g., as the result of exercise and consequent lactic acid formation.

It is not necessarily a pathological condition in itself, but is rather a symptom of disturbed function. Like fever or tachycardia, however, acidosis in itself becomes a danger when it has reached a sufficient degree of intensity.

Sources of Acid in the Blood. A word is not amiss here as to the origin of the various acids of the blood. Acid radicals come normally to some extent from bodily catabolism, but largely from the food. Meat is the great acid producer. Under normal conditions, however, there is often considerable acid production of bodily catabolism. Acid products always result from deficient oxidation. During vigorous exercise the muscles may not get sufficient oxygen and lactic acid is the resulting end-product, instead of CO_2, as normally. Again, lack of carbohydrate participation in the catabolism of fats results in a considerable quantity of diacetic and B-hydroxy-butyric acid.

It is evident from what has been said that acidosis may arise in one of two ways and the distinction is important: (1) By overproduction of acid, with which the kidney is unable to keep pace; (2) By failure of the kidney to excrete normal amount of acid even without overproduction.

Later Methods for Demonstrating Acidosis. Just as the thermometer and stethoscope are necessary apparatus in the diagnosis of fever and heart lesion, so do we need apparatus and simple methods for detecting acidosis. You are all familiar with the symptoms of acidosis starting with hyperpnea, ranging from a slight increase in lung ventilation to a marked air hunger; later there is headache, nausea and vomiting, coma, respiratory paralysis and death. It is extremely essential to be able to recognize the beginning of acidsosis before the stage of air hunger and coma.

The tests for early stages of acidosis fall naturally from what has been said into three classes, e. g., urinary and blood analysis and respiratory data. Practically all these tests, either directly or indirectly, constitute approximate determination of the bicarbonate of the blood.

Urinary Analysis. Here we have the methods for the determination of increased acid excretion and especially when the increase is due to any particular acid, as B-hydroxy-butyric, diacetic, etc. You are all familiar with the significance of these acid bodies in the urine. However, that we cannot absolutely depend on these tests is quite readily understood from what has been said of the kidney function in eliminating the non-volatile acids. Evidently quite a marked degree of reduction in the alkali reserve may have taken place before such acid bodies appear in the urine. Then again the kidney mechanism may be so injured that it is no longer capable of regulating the normal threshold of acid excretion.

Another fact has been brought out by Van Slyke[4] when he cites an instance in which he observed an excretion of 20 gms. of acetone bodies per liter of urine without an abnormally low plasma CO_2 capacity. The increased ammonia output is also of some value when present, but is one of the later manifestations and its absence by no means rules out an acidosis due to retentiom.

Respiratory Analysis. The alveolar air is in equilibrium with respect to its CO_2 content with arterial blood. Consequently, in accordance with the law of gas solubility, the concentration of CO_2 in alveolar air is directly proportionate to that of free carbonic acid in the blood. And the latter has been shown, with

normal respiratory control, to be kept proportional to the bicarbonate concentration.

Of the methods for the determination of the alveolar CO_2 tension, that of Haldane and Priestly[5], that of Plesch[6] and that of Marriott[7] are the best. The latter method I wish to demonstrate before you this evening. In the words of Marriott, "The method depends on the fact that if a current of air containing CO_2 is passed through a solution of sodium carbonate, or bicarbonate, until the solution is saturated, the final solution will contain sodium bicarbonate and dissolved CO_2. The reaction of such a solution will depend on the relative amounts of alkaline bicarbonate and the acid carbon dioxide present. This is turn will depend on the tension of CO_2 in the air with which the mixture has been saturated and will be independent of the volume of air blown through, provided saturation has once been attained.

High tension of CO_2 changes the reaction of the solution toward the acid side. Low tensions have the reverse effect; hence the reaction of such a solution is a measure of the tension of CO_2 in the air with which it has been saturated.

The reaction of such a solution may be determined by adding to it an indicator such as phenolsulphonephthalein, which shows over a considerable range of reaction definite color changes. A certain color indicates a certain reaction.

Standard solutions of a definite reaction and indicating a definite CO_2 tension may be prepared by mixing acid and alkaline phosphates in definite proportions. Such solutions keep unaltered for long periods.

Collection of Alveolar Air. A rubber bag of approximately 1500 c.c. capacity is connected by means of a short rubber tube to a glass mouth piece. About 600 c.c. of air are blown into the bag with an atomizer bulb, and the rubber tube clamped off by a pinchcock. The subject should be at rest and breathing naturally. At the end of a normal expiration, the subject takes the tube in his mouth; the pinchcock is released and the subject's nose closed by the observer. The subject breathes back and forth from the bag four times in twenty seconds, emptying the bag at each inspiration. The observer should indicate when to breathe in and out. Breathing more frequently will not alter the results. At the end of twenty seconds, the tube is clamped off and the air analyzed. The analysis should be carried out within three minutes time, as carbon dioxid rapidly escapes through rubber.

The foregoing procedure applies to patients who are capable of cooperating to some extent. In the case of comatose patients, the initial amount of air in the rubber bag must be greater (1000 c.c. at least), and the period of rebreathing prolonged to thirty seconds. This is necessary, as it is not feasible that the bag be completely emptied of air at each inspiration; and therefore a longer time is required for the carbon dioxid tension in the bag and in the lungs to become equal. The initial amount of air in the bag should be such that it is at least one-half and preferably as much as two-thirds emptied at each inspiration. Since comatose patients cannot hold the mouthpiece, some form of mask is necessary. This may be a gas anesthetic mask, or one especially devised for this purpose by Marriott.

Technic of the Analysis. In analyzing a sample of air, about two or three c.c. of the standard bicarbonate solutions are poured into a clean test tube of the same diameter as the tubes containing standard phosphate solutions, but from 100 to 150 mm. long. Air from the bag is then blown through the solution by means of a glass tube drawn out to a fine capillary point, until the solution is saturated, as shown by the fact that no further color change occurs. The tube is stoppered and the color immmediately compared with that in the standard tubes. By interpolation, one can readily read the millimeters. Color changes are not so sharp above 35 mm. as at a lower end of the scale, but here changes are of less significance. In making the color comparisons, the solution being compared is placed between the two standards which it most nearly matches. When there

is doubt as to whether the color of the solution is higher, or lower, than one of the standards, changing the order in which the tubes are placed in the comparison box will generally make the relationship clear.

The standard solutions are so prepared as to give correct results when the determination is carried out at a temperature of from 20 to 25 degrees C (from 68 to 77 degrees F.) When the room temperature is considerably higher, or lower, than these poitns it is advisable to immerse the tubes in water approximately 25 degrees C. during the blowing. They may be removed from the water for the color comparison, however, provided this is quickly made. The differences due to the ranges of temperature occurring under ordinary circumstances are practically negligible.

No correction for barometric pressure is required, as from the nature of the determination, barometric fluctuations are self-corrective. Variations in the temperature of the subject are never great enough to affect the value as much as 1 mm., and therefore may be neglected.

In normal adults at rest the CO_2 tension in the alveolar air, determined by this method, varies from 40 to 45 mm. Tension between 30 and 35 mm. are indications of a mild degree of acidosis. When the tension is as low as 20 mm., the individual may be considered in imminent danger. In coma, associated with acidosis, the tension may be as low as 8 or 10 mm. I have seen one case as low as 12 mm. and he died within an hour of making the determination. In infants the tension of CO_2 is from 3 to 5 mm. lower than adults.

The advantage of the method lies in its simplicity of operation and the fact that it is of small bulk and easily portable. It is rapid and sufficiently accurate for clinical purposes and therefore it is recommended as a part of the busy practitioner's outfit.

The disadvantages of this method are chiefly those of delicacy and accuracy. Any method that depends upon the comparison of colors is naturally open to a greater or lesser degree of error, depending upon the personal equation and kind of colorimeter. Simple comparison of comparts is the poorest of color methods. Then, too, other conditions besides acidosis may affect the CO_2 tension of the alveolar air. Thus stimulation of the respiratory mechanism by drugs (caffein) or intracranial lesions; or its depression by the same agents (morphine) may noticeably affect the tension of CO_2. Also any change in the lungs which affect their function will of neccesity affect the composition of the alveolar air and therefore the method is unsuitable in cases with pulmonary affections.

Blood Analysis. Of the methods of involving the blood, the determination the H-ion concentration has been used extensively. The gas-chain method has been the most used for this determination, but is long and difficult, requires delicate and expensive apparatus, and is therefore not applicable to clinical determinations.

Levy, Rountree and Marriott[8] have proposed a method which involves the well known principle that different indicators show their color changes at varying degrees of hydrogen-ion concentration. For example, methyl orange changes from pink to orange as the pH of its solution changes from from 3 to 5. At intermediate points, various colors may be obtained and certain color indicates a definite pH. Similarly phenolphthalein changes from a colorless to pink between pH6 and pH10 and can be used for measurement of the H-ion concentration between these two points. Standard solutions of known pH are prepared at H-ion concentrations approximating that of blood under normal and abnormal conditions. The known comparts are compared with the solution in question, i. e., blood.

In using the indicator method it is necessary to exclude the coloring matters of the hemoglobin and the proteins. This is done by dialyzing the blood through collodion sacs into a solution of normal NaCl.

Technique of Method. The work must be done in a room free from fumes of acids or ammonia. Blood is drawn with as little loss of CO_2 as possible. This is accomplished by drawing it under paraffin oil.

Approximately 1 c.c. of blood is pipetted into a dialyzing sac which has been washed inside and outside with normal salt solution and which has been tested for leaks by filling with salt solution. The sac is lowered into a glass tube, 100x10 mm. inside measurement, containing 3 c.c. salt solution and kept there until the fluid on the outside of the sac is as high as it is on the inside. From 5 to 10 minutes are allowed for dialysis. The collodion sac is then removed and .2 c.c. of .01 per cent phenolsulphonephthalein indicator solution added and thoroughly mixed with the dialysate. This unknown tube is then compared with a series of standard tubes until the corresponding color is found. Normal blood serum by this method gives a pH of 7.6 to 7.8. In acidosis the pH varies from 7.55 to 7.2.

The advantage of this method is that it is relatively simple and easy as compared with the gas-chain method.

The disadvantages of the method may be summed up as follows: (1) The dialysate does not necessarily have a reaction that is proportional to that of the original blood. (2) Such small quantities of acid and alkali are employed that it is very difficult to tell just when slight difference in tint has been produced. (3) The difference between the normal and acidosis figure (7.6 and 7.5 to 7.2) is so slight that very accurate readings of the color changes are necessary. With the prescribed method of using comparts and the personal equation involved, the required accuracy is seldom attained. (4) Even with the precautions prescribed above it is impossible to be sure that the amount of CO_2 in the different samples of blood is the same, which means, of course, a difference in pH value.

Determination of the CO_2 in the Blood. As was pointed out in discussing the physical chemistry of the blood, its bicarbonate concentration represents the alkaline reserve and is so constant normally that any variations from normal forms one of the most reliable and delicate means of determining the early evidences of acidosis.

D. D. Van Slyke[1] has devised a method of measuring the CO_2 capacity of the blood, which is so simple and easy of manipulation that it is eminently suited for clinical application, and at the same time is so delicate and accurate that it has already become a recognized method for accurate scientific work. The method depends upon the fact that CO_2 is liberated from a solution in a vacuum under the reduced pressure. The blood is acidified in order to liberate the CO_2 radical from its bicarbonate combination.

Complete extraction of the gas is not attempted, but the volume relations between the liquid and the free space of the apparatus being known, the residue remaining is calculated from the solubility coefficient of the gas.

The venous blood is saturated with CO_2, either from a tank at 5.5 per cent, or by air from the lungs of the operator, which is remarkably constant at 5.5 per cent. This gives us results which are approximately that of arterial blood and indicate the bicarbonate content of the latter.

Technique of the Method. The blood is drawn from the anti-cubital fossa with the patient at rest and without stasis of the blood by ligature. The blood is best drawn into a tube containing powdered oxalate and paraffin oil. The oxalate prevents coagulation and the paraffin prevents the escape of the CO_2.

Having centrifuged the fresh oxalated blood, pipette off the clear plasma and place it in a separatory funnel of about 300 c.c. capacity. Slight hemolysis does not affect the results appreciably, but hemolysis should be avoided as much as possible by immediate centrifugalization. In order to determine its alkaline reserve, the plasma is saturated with a carbon dioxid at

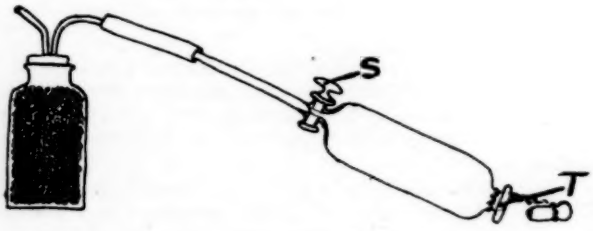
alveolar tension. In other words, the operator blows vigorously through a bottle containing glass beads into the separatory funnel. If one blows directly into the separatory funnel, enough moisture condenses on the walls of the funnel to appreciably dilute the plasma. Close the funnel at stopcock *S* (Fig. V) and stopper *T* just before the stream of breath stops, and shake for one minute in such a manner that the plasma is distributed as completely as possible about the walls. After the shaking has lasted a minute, blow a fresh portion of the alveolar air through the beads into the funnel and shake for one minute.

The CO_2 apparatus (Fig. VI) is held in a strong clamp, *e*, which is lined with rubber, and the lower stopcock is supported by an iron rod, *g*, which is also covered with soft rubber tubing. The apparatus is completely filled with mercury. Care should be taken that capillaries *a* and *b*, which are above the upper stopcock, are also filled with mercury. There should be no air bubbles within the apparatus. Six dropping bottles, which contain the following solutions, should be at hand:

1. Distilled water. 2. Phenolphthalein (1 per cent in 95 per cent alchohol.) 3. Normal ammonium hydroxide. 4. Caprylic alchohol. 5. Normal sulphuric acid. 6. Mercury.

The mercury levelling bulb *L* should be hung by wire *K* on an extension about on the level with the lower cock *f*. The apparatus must be thoroughly

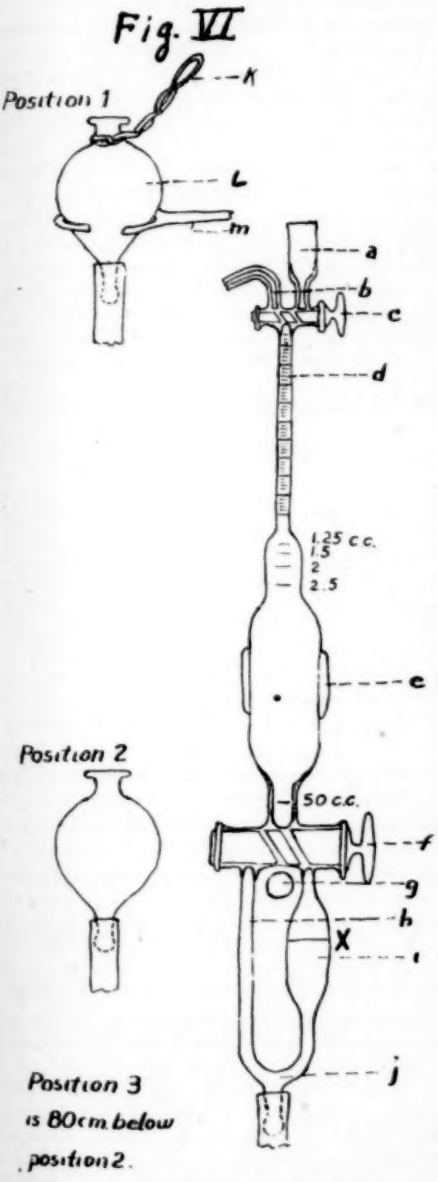
Fig. VI



cleaned before the determination is started. The apparatus can then be tested by allowing the mercury to run down and then forcing it up by raising and lowering the bulb *L*. The air is forced out and the mercury is caught in a bottle. (This is done until there is not a single air bubble in the apparatus). Add one drop of phenolphthalein to the upper cup *a* and a drop or two of the ammonium hydroxide. Now dilute this with about 1-2 c.c. of distilled water and draw off all except about two drops of the alkaline solution.

Now introduce 1 c.c. of the saturated plasma into the cup and allow it to flow under the alkaline solution, so that none of the carbon dioxide escapes. Turn the upper stopcock, *c*, so that *a* and *d* are connected and allow the plasma to run in until capillary is exactly filled. Add 0.5 c.c. of distilled water to cup *a* and then allow to run down to capillary. Repeat this, taking care that no air enters the apparatus with the liquid. Now admit into capillary, one drop of caprylic alchohol to prevent foaming, and pour about 1.5 c.c. of the sulphuric acid into the cup. Admit enough of the acid into the apparatus, carrying the caprylic alchohol along with it, so that the total volume in the apparatus is exactly to the 2.5 c.c. mark. Draw off the excess sulphuric acid. Now place a few drops of mercury in cup *a* and allow to flow down to capillary, in order to seal same and make it capable of holding an absolute vacuum. During the whole operation, the lower stopcock *f* should remain open, and when the apparatus is set up it should

be in such adjustment that, if the wire *K*, which is connected to bulb *L*, is lowered to position 2, the mercury will run to the mark *X* on the figure, care being taken that the mercury will not run into fork *j*. Place wire *K* in Position 3, and allow the mercury to fall until the meniscus of the mercury has dropped to the 50 c.c. mark on the apparatus. This is controlled by stopcock *f*. The bubbles of CO_2 are now seen escaping.



In order to completely extract the carbon dioxide, remove the apparatus from the clamp and shake by turning it upside down about a dozen times. (The thumb should be placed over cup *a* so as not to lose any of the mercury). Then replace the apparatus, the mercury leveling bulb *L* still being at the low level, and allow the solution to flow into the small bulb below the lower stopcock (right side). Drain the solution out of the portion of the apparatus above the stopcock *f* as completely as possible, but with out removing any of the gas (the last drop being allowed to remain above). Now raise the mercury bulb *L* in the left hand, and with the right hand immediately turn the lower stopcock *f* so that the mercury is admitted to the upper part of the apparatus through the left hand entrance of the stopcock without readmitting the watery solution. Hold the leveling bulb *L* beside apparatus so that its mercury level corresponds to that in the apparatus, and the gas in the latter is under atmospheric pressure. A few hundredths of a cubic centimeter of water will float on the mercury of the apparatus but this may be disregarded in levelling. The calculation of the result into terms of volume percentage of carbon dioxide, bound as carbonate by the plasma, is quite complicated and is either accomplished by referring to a table devised by Van Slyke, or by using the direct reading from the apparatus, minus 0.12.

Plasma of normal adults yield 0.65 to 0.90 c.c. of gas which is the direct reading on the apparatus. If .12 were subtracted, the normal figures would be 53 to 78 in terms of volume per cent of carbon dioxid bound, chemically, by the plasma. Figures lower than 50 per cent in adults indicate acidosis. Figures aslow as 45 are normal for childrem. The exact calcula-

tion of the result into terms of carbon dioxide bound as carbonate by the plamsa is quite complicated and consequently the worker is advised to subtract 0.12 from his reading on the apparatus. The result thus obtained gives approximately (within 2 to 3 per cent) the volume per cent of carbon dioxide bound by the plasma.

The bicarbonate content of the blood is more desirable as a standard for measuring change in the acid-base balance than the H-ion concentration, for the reason that, while the bicarbonate decreases progressivley as soon as the normal excess of bases over acids begins to be depleted, rise in the blood pH is usually one of the latest changes to follow. The reason for this is that, until a large part of the blood bicarbonate has been exhausted the body can, by accelerated respiration, maintain the normal acid-base balance in the arterial blood. The H-ion concentration being directly proportional to this is therefore kept normal.

Clinical application of these methods for the early detection of acidosis may be made in a great variety of cases. They may be roughly classified as follows: (1) Overproduction of acid due to deficient oxygenation. Such cases include severe exercise, mountain sickness, acute anemias, gas poisoning and other forms of asphyxia, decompensated heart lesions, and poor circulation in general. (2) Primary lack of oxygen with compensatory raising of the threshold of acid secretion. Examples of this type are seen in acidosis of high altitudes and pregnancy. (3) Abnormal catabolism with production of large amounts of acids. These include diabetes, starvation, post-operative toxemias, and the diarrhoeas and cyclic vomiting of children, burns and septicemia. (4) Kidney insufficiency with retention of the normal acid output—i. e., severe nephritis, pus kidney, pneumonia, scarlet fever and other infections.

Treatment. There is still a great deal of uncertainty as to the treatment of acidosis. However, certain general principles are evident. The acidosis of high altitudes, anemia and pregnancy, call for no treatment as it here is a physiological compensatory mechanism. Alkalis are indicated in acidosis of the overproduction type, where the elimination is free. Allen and Joslin, however, warn against alkali therapy in diabetes. A free flow of urine is to be aimed at in all cases. Water is the best diuretic and glucose is probably next. Glucose is essential in diabetes, and probably many cases have been thrown into coma by the sudden withdrawal of sugar, which not only removes the very efficient diuretic but also leaves the fats to be improperly catabolized with the production of B-oxybutyric and diacetic acid.

When kidneys are damaged and unable to excrete acid, it is probably useless to add alkalis. Free purgation and elimination by skin is most effective here.

Meat is a great acid producer and should be avoided when there is danger of acidosis.

Fresh air blowing across the face probably attains its quieting effects in pneumonia by the relief of acidosis.

Finally, rest and the prevention of all activity which increases metabolism, is indicated.

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TONSILLECTOMY BY A MODIFICATION OF THE SLUDER TECHNIQUE*

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For the past five years tonsillectomy has been universally adopted by all nose and throat men of note, in preference to tonsillotomy.

The question before the throat man of today is the most simple and quickest method of tonsillectomy. In my opinion, the best operation is the modification of the Sluder technique under general anesthesia, on account of: (1) The brief period of time required to perform the operation. (2) The small amount of hemorrhage during the operation. (3) Minimizing the chances of post-operative hemorrhage, and last, but not least, the preservation of both the anterior and posterior pillars of the tonsillar fossa.

The instruments used in this operation are a mouth gag, Freer's septum knife and a Sluder tonsillectome. The latter instrument is very similar to the old McKenzie tonsillotome, differing from it in the fact that it has a blunt blade and much heavier frame. The instrument is made in three sizes, viz: large, medium and small. I find that the medium sized instrument can be used in practically all cases over six years of age, while the small size should be used under that age.

The mouth gag should be either the Manhattan or Denhardt, as either of them give good leverage in forcing the mouth open, and is not in the operator's field. The Manhattan is the better for adults, as it has more leverage, and is the more powerful instrument of the two.

The technique of this operation in brief is as follows: The patient is placed in the dorsal position, and given a general anesthetic—after inserting the mouth gag, use the blade carrier of the tonsillectome as a tongue depressor, observe the tonsils thoroughly, then swing the instrument around so as to have the fenestrum posterior to the tonsil to be removed, having the handle of the instrument on the opposite side of the face—depress the handle of the instrument, by so doing the fenestrum of the tonsillectome is elevated and the tonsil is lifted out of the fossa, putting the anterior pillar on the stretch; in other words, the tonsil to be removed stands out above the fenestrum of the instrument. Then place the first finger of the free hand on the anterior pillar and force the tonsil through the fenestrum. Push the blade home behind the anterior pillar, being careful not to release hold on the tonsil, otherwise it will slip out of the fenestrum. After this, having engaged the tonsil, elevate the handle of the instrument and observe the uvula, in order to be sure that it is free. With a Freer's septum knife sweep the blade around the anterior groove of the fenestrum, at all times keeping it in contact with the blade of the Sluder. By doing this one cuts all fibres attached to the tonsil and frees it completely from its fossa with the result that no traction is made on the pillars.

The technique of the original Sluder operation is practically the same up to the point where the Freer's septum knife is used. After engaging the tonsil, the operator then makes traction on the tonsil and pulls it out in toto, breaking the fibres from the capsule. The objectionable points to this operation are: first, that it may distort both pillars on account of the great amount of force exerted in pulling the tonsil out of its fossa; second, that one may engage a small amount of anterior pillar in the instrument near the base of the tonsil, and when removing same may tear away quite a bit of mucous membrane, thus leaving a large amount of muscle tissue uncovered, which is slow to heal.

Some men advocate the use of an instrument with a sharp blade. My objection to this procedure is that once applied, and the blade pushed home, the instrument cannot be removed if the tonsil is not properly engaged, because the sharp blade cuts instead of crushes. Other men advocate the use of double bladed instrument, the sharp blade above the blunt. The technique of the operation

*Read at Medicine Park, Oklahoma, May 9, 1917.

by this instrument is the same as that of the Sluder up to the point where the tonsil capsule is freed from its fossa. During my house service in the Post Graduate Hospital in New York, we tried this instrument thoroughly. We found that it left a nice tonsil fossa, but had a large number of post-operation hemorrhages following. The reason for this is the fact that the two blades of the instrument are about 1-16 to 1-8 of an inch apart, and when the sharp blade is pushed home it cuts throuh the network of veins surrounding the tonsil capsule. Were the sharp blade under the blunt one, the operator would leave the capsule in situ, which at all times must be removed in tonsillectomy.

The Sluder method or any of its modifications can be used in 98 per cent of tonsillectomies when in the hands of a man familiar with its technique. I have performed tonsillectomies on more than one hundred cases within the past eighteen months, and have followed the technique I have described, in all except two. These two patients weighed over 180 pounds, had short thick necks and gave histories of having had repeated tonsillar abscesses.

This operation is contra-indicated in malignancy of the tonsil on account of the extensive dissection required in this condition.

In patients where ether, chloroform or local anesthesia are contra-indicated, the operation I have described above may be done under gas oxygen anesthesia.

Discussion

Dr. H. C. Todd, Oklahoma City: After getting Dr. Stroud's paper, which came just prior to my regular clinic at the University, I manned myself with the proper instruments and went out there to try to execute this method and see how it worked so I could discuss this paper a little more intelligently. I think during the whole period of my clinic I have had anywhere from two to a dozen for operation, but this last Wednesday when I went out there I found just one single, lone medical student, and I didn't dare to use any new technique on him.

When the Sluder technique first came out, I became very much interested. I had been taking out tonsils for many years, and I thought if there was a simpler method and one better than I had employed, I wanted to know it; I wrote to Dr. Sluder and asked him for all the material he had produced on the subject and he sent me the reprints he had at that time. I bought a Sluder outfit—what they had at that time. I got the original two sizes and I went out to my clinic and tried it on 42 cases. I realize that technique is not acquired in a day or in a week. The percentage of failure was so great in my hands that I felt that either the operator or the technique was a dismal failure. I tried to follow the technique prescribed—because Sluder says if you do not use that technique his instrument is no good. I wrote an article which some of you may have read, which appeared in the *American Medical Journal*, and the thing that surprised me was the amount of commendation I got from that little article, from men of some note over the country, showing that the Sluder method was not considered with a great deal of favor at that time.

The reason I have not used the Sluder technique is the fact that in my opinion the most difficult tonsillectomies that we have cannot be performed by the Sluder instrument. Therefore I would rather keep the technique that I have on the easy ones so that I will be prepared to operate on these difficult cases.

I do not believe, gentlemen, that there is any instrument devised that will ever take the place of technique which puts the operator in positions that he will know every minute of the time that he is operating, just exactly what he is doing and just exactly what effect his instrumentation is having; and I do not believe that this is possible with the Sluder instrument. I am going to say this, after five or six years of operating with the old McKenzie tonsillotome, which is similar to the Sluder, that I did some mighty good work and I am going to admit that I did some mighty poor work. My great objection to the Sluder technique is that you cannot engage a certain per cent of tonsils in the tonsillotome or is it possible

to get them out entirely without injuring adjacent structure, and a hemorrhage may result.

I am going to make this statement before I sit down, that I do not believe that the Sluder or any other instrument like it will ever come into universal use, and I believe that the Sluder instrument in a few years will be as *passe* as the McKenzie tonsillotome is today.

Dr. J. H. Barnes, Enid: I want to say that I have used the Sluder myself. What I like better than that is Beck's modification of the Sluder. I use that more than any other instrument. I use that in preference to the old Tidings method of snare. You will get less hemorrhage and less damage to the throat by using the Beck snare which he calls a modification of the Sluder. I would prefer that I use a clamp and knife rather than the manipulation that the doctor pleads for in his paper. The knife gets in behind, next to the posterior pillar, and you are not so apt to injure the pillar with a sharp knife. Those methods are good, I think, in the hands of those who have mastered the technique. I will say that 95 per cent of the tonsils can be taken out by the Beck system. You can take out the whole or pieces of the tonsils by the Beck.

Dr. L. A. Mitchell, Frederick: I wish to say that I have enjoyed the paper very much. I was glad to hear this discussion upon the Sluder instrument. Since I began using the Sluder instrument, my work has been much more satisfactory than ever before, and I have been able to develop so much better technique than I had ever had before that I would dislike to give up the use of the Sluder instrument.

In the past eighteen months, when doing some of my best work with the Sluder instrument, I have had the pleasure of working over some of my bum cases that I did prior to that time with the snare and other methods, getting out some of the remnants and pieces. I believe the doctor hit the keynote when he said that we ought first to get the technique. I had to get it before I was satisfied. I have never had an instrument that gave me as much satisfaction as the Sluder. The facts of the case are that before I got it I never went into a case as comfortable as I would like to be.

While it is true that, as has been said here, sometimes we do not get all of the tonsil—some little particle is left, but I have had the pleasure (as we all do) of seeing some of the other fellow's work, and I believe from what I have seen that those cases where the Sluder instrument has been used, show the cleanest work of all of them.

I want to say, too, that we must take into consideration that there is a lymphoid tissue in the throat that is external to the capsule of the tonsil and often it is thought that it is part of the tonsil left there when it is only a part of other lymphoid tissue—not tonsil tissue.

I believe that a man, in doing tonsil work, if he will, after getting his tonsil out, examine the tonsil, he can tell better what kind of a job he has done than by looking back into the throat. If you will examine your tonsil and find that you have your capsule complete you have done a complete job.

Unfortunately, when I first began the use of the Sluder instrument, I did something which should never be done; I used the instrument without seeing it demonstrated. I had never seen the instrument used and didn't use it right; I overlooked a careful reading of the technique. But that first time I did a dandy operation; it was one of those easy cases where, as we all know, it was ideal for the Sluder.

There is another thing: in the use of the snare I have always had trouble in dissecting the tonsil. As I have done it, and have seen it done, after you get your dissecting started, before you can tell much about it, your work is blinded by the blood. For that reason, I could not develop very much technique. In the Sluder operation we can get in and get out and have the tonsil cut before there is any blood there.

Dr. W. E. Dixon, Oklahoma City: I think in the tonsil work it is not advisable to ever give morphine before operation. I think what deaths have been caused have been due to giving the morphine. Prior to the operation, I use atropin.

Dr. Stroud, closing: In conclusion, I think that the work can be done where you have the patient completely relaxed and under the anesthetic. I have operated at least four or five patients within the past 18 months that have had a number of peritonsillar abscesses. One 30 years old and one 35, and both weighing over 180 pounds, had been heavy drinkers and smokers in their time. I was never able to relax them thoroughly and we had to dig out the tonsils as best we could. I think you can use the Sluder on any case you can use the snare.

ACUTE SUPPURATIVE OTITIS MEDIA*

By W. ALBERT COOK, M. D., Tulsa, Oklahoma.

During the changeable weather of the past winter such diseases as influenza, scarlet fever, diphtheria, colds, and kindred troubles, have been so prevalent that there has been an unusual amount of middle ear troubles and so it is worth our time to refresh our minds on this subject.

It is a lamentable fact that we can look around us and daily see the increasing number of deaf and partially deaf people—which might, to a certain degree, be remedied if the people generally understood the conditions better. There must be an education of the public to the fact that a trivial affair, allowed to run along, will eventually cause some damage which no treatment can remedy.

By suppurative otitis media we mean an inflammation of the tympanic cavity with suppuration; in some cases it is hard to distinguish between this and an acute catarrhal otitis, especially in the beginning.

The tympanic cavity is situated within the petrous portion of temporal bone about one-half inch long from the back, one-third inch high and about one-fifth inch from drum membrane to inner wall. This cavity is separated by thin bony plates from some very important structures. The brain above, the narrow floor separates it from the jugular fossa; the inner wall almost vertical, contains two openings, the round and oval windows which connect with the internal ear, the oval window being closed by the foot plate of the stapes; just above this window is the aqueductus Fallopii for the facial nerve, posteriorly above is the opening to the mastoid antrum; the aditus ad antrum; the outer wall of this cavity is composed of the thin elastic tympanic membrane and the body ring, and just underneath the anterior wall lies the carotid canal.

Within the cavity is the chain of bones which are the connecting links between the sound receiving and perceiving apparatus. Anteriorly is the orifice of the eustachian tube, which not only is involved in these inflammatory conditions but is usually the canal through which the infection comes: so a few words regarding the tube, which is a direct connection between the ear and nose and throat. The tube in an adult is about 1 1-2 inches long. From the pharynx it passes outward, backward and upward; the outer third of the tube is a bony canal while the inner two-thirds is an elastic fibrous cartilaginous tube, lined throughout by ciliated mucous membrane, which is a continuation of the pharynx. The tube is narrowed at the bony and cartilaginous juncture. The cartilaginous portion is acted upon by two muscles, the levator palatii and the tenor palatii, whose actions under normal conditions are to dilate the tube and keep the air pressure in the middle ear equal to that in the pharynx, and because of the shortness of this tube and the comparatively large caliber in the child there is much more danger of infection being carried into the ear, thus the cavities of the temporal bone are looked upon by some as accessory cavities to the nose and throat, very liable to be involved or affected by inflammation of any kind involving the nose or pharynx.

*Read at Medicine Park, Oklahoma, May 9, 1917.

The cause of the inflammation may be traumatic, as from swimming, concussion of air, very loud noises and direct injury. Usually we see it coming from colds—especially in children, and usually these children are affected with some nasal obstruction and adenoids besides the congestion of the cold; also bad teeth are a source of infection, however, it occurs as a severe and frequently a destructive complication of many diseases, principally scarlet fever, diphtheria, smallpox, measles, typhoid fever, syphilis or tuberculous. The most frequent and destructive of these complications usually is scarlet fever; so rapid is it at times that only a few hours are necessary for almost complete destruction of the drum membrane and ossicles, and becoming chronic, is a source of constant annoyance and danger for years. Although it has been demonstrated that the micro-organisms are found in the normal ear which do no harm, yet suppuration usually exists before bacterial infection, and then we have first a single infection and later the infection becomes mixed with very many kinds of bacteria. In this pus we may find any of the following, and in many cases a large number of them: streptococcus pyogenes, pneumococcus, staphylococcus, typhoid, tubercular bacilli and influenza and many others. The streptococcus is most virulent and more frequently causes mastoid complications, in fact, when found, indicates a more or less serious condition, and by some is a diagnostic point in determining the necessity for a mastoid operation, even though the symptoms otherwise do not justify an operation.

An attack usually begins with pains in ear and head, chilly sensations, perhaps a chill and fever with temperature varying from 100 to 105. A child will roll its head about and toss and rub its hands over the ear and back of the ear, screaming and crying; sometimes the child may have convulsions, caused either from the high temperature or pressure. On inspection the drum membrane is seen to be more or less red and inflamed. The hearing is dulled and after a few hours or days there will be usually a bulging at some point of the drum membrane, at which point if allowed to run its course there may be a perforation; this may not be the point of election, but because it has been allowed to run on and perforate, the duration of the disease is perhaps lengthened and the final outcome is very much different from what it probably would have been if an incision had been made. The perforation being ragged in shape, heals more slowly than a clean cut wound.

After perforation or incision, the fever drops and the pain subsides and the patient is fairly comfortable and will usually remain so, except when the opening may become clogged; then there will be a repetition of former symptoms, pain and fever.

The majority of these cases are those which usually go on to the uneventful recovery after a few days or weeks, when the pus ceases and the opening closes slowly, taking weeks in some cases, and to this extent does the hearing remain deficient. Some of these openings remain open not only for a long time after suppuration ceases, but because of so great destruction of tissue never close, thus the prognosis depends upon the health of the individual, the severity of the attack, the kind of infection and the location. In the first stages of the disease the treatment would call for the relief of the intense pain and an attempt to abort the threatened attack.

For the pain, we try to give some relief by prescribing hot drops to be used frequently; these drops may contain carbolic acid, glycerine, atropin, cocaine, or some form of opium. Leeches are used by many. Externally, heat should be used in most convenient forms, with hot irrigations; after using heat, judgment and caution must be exercised or the trouble may be aggravated at that time or later. In spite of all this, it may be necessary to give something by mouth or hypodermic to relieve the excrutiating pain and nervous condition, though if possiple this should be avoided, as the large per cent of these troubles comes from colds; this should be treated by the most approved methods, calomel and oil

for children, and salines, restricted diet and, if necessary, sedatives and such other internal medications as the case demands.

In many cases, if there seems to be a fluid present after cleansing the nose, the eustachian tube may be opened and drainage established through the canal, and it may do wonders in removing the trouble. Some recommend very vigorous treatment of the postnares—when these attempts fail to bring about a cessation of the symptoms and the inspection shows that the case will go on to suppuration and the drum membrane is bulging, an incision of the drum membrane should be made; this should be made in bulging part or, better, in the posterior quadrant; some recommend a flap, but all advise a large opening. Mentholphenol and cocain is recommended and used; it anesthetizes the inflamed membrane to the extent that there is not much pain during paracentesis. I have used and found as a very good substitute, cocain solution, 10 per cent first, and then campho-phenique acting equally as well, it is not usually necessary to give a general anesthetic except in children. In most cases at the time of incision, there will be seen only serum and blood, but in a short time there will be pus; usually there will have been hot irrigations and drops used which will have rendered the external ear clean, but if not, it should be cleaned as well as the inflamed condition will permit before the membrane is opened.

As soon as the immediate pain of opening the membrane ceases, there should be relief, but if later the symptoms recur, it may be necessary to enlarge the opening—however, if it is found that the infection has spread into the mastoid or the symptoms point to some other grave lesion, the patient must be put to bed and watched with proper treatment or operated upon for that particular involvement. After the drum membrane has been opened, a hot solution of boric acid or carbolic acid and glycerine, with or without an opiate, can be used; drainage being established, it is our aim to keep up a free and uninterrupted drainage which can only be maintained by keeping the canal clean and the surplus amount of pus kept out; this is best done by irrigation, which should be done with boiled water, with salt, boric acid or carbolic acid in it. The manner employed in doing this will depend upon the conditions to be met, age of patient and kind of pus. The pus can be wiped out very satisfactorily with cotton on an applicator, and I have found in small children that the little ones will remain much quieter from this method than from any other; also the wick is used satisfactorliy in some cases, but the one object is to drain freely. Some astringents may be used after cleansing. For many years there has been an epidemic of middle ear troubles during the winter months. The catarrhal bacilli is found in the early stages almost to the exclusion of any other micro-organism; these infections have shown some very painful and bad symptoms, but have usually cleared up without such serious troubles.

The mixed infection serums have taken a place in the treatment of these troubles and have found many advocates; but this method of treatment is not generally used, although in some cases the attack extent seems to have been shortened. For recurrent attacks of otitis, it is necessary to correct any nasal troubles which may exist, and also remove all adenoid tissue, especially around the mouth of the tubes whether there is any symptoms of adenoids other than the ear trouble. Enlarged or inflamed tonsils should be removed.

Discussion

Dr. L. A. Newton, Oklahoma City: I suppose I am doomed to always have something to do with suppurating ears, having read two papers before this association on this subject and now on the program to discuss this paper. I think it is a very excellent paper and, of course, it is one that is especially interesting this year because it seems to me there has been more complicated cases this year than I have ever seen, particularly those with mastoid symptoms.

The doctor speaks about doing a paracentesis. I have seen several cases this year that have not ruptured readily and these are the cases that give you mastoid symptoms. I believe the earlier we can get hold of these cases and do

a paracentesis, the better. There are only a few cases having genuine mastoid disease. I had one case the past winter that was apparently a severe case of mastoiditis but it cleared up very nicely without operating. I have a case now, the patient had a very painful ear and every indication of mastoiditis. I used ice packs over the mastoid and it is clearing up nicely. The patient had sagging of the external canal and a very painful and tender mastoid with temperature. Recently I have been using hot, dry air in my suppurating ears. After I clean the ear thoroughly I use this superheated air, and I find that treatment splendid. They have all gotten well quickly. I don't know just where I got the idea, but I got it out of some of the current journals; but I am very enthusiastic about the hot, dry air. You can use it so hot that the patient will dodge and flinch from the heat.

Q. How long do you use it, doctor?

A. I usually heat the hot air plug or bulb five or six times and blow the air into the ear. I would like to have you try it. I believe the Victor people get out some instrument for that purpose. The fact is, I believe many of these cases would get well if you persisted in keeping the ear dry and clean, without doing a mastoid operation. I am relying more on alcohol than anything else as a medicine to be put in the ear. I usually make it about fifty per cent, depending on how well they can stand the pain, but I usually fill the ear full and then have them swallow several times in order to try and work it into the middle ear.

Dr. M. K. Thompson, Muskogee: I think after paracentesis has been performed the patient should be put to bed and the ear irrigated every three hours for the first twenty-four hours, and then if the discharge diminishes, reduce the irrigations to at least three times a day.

Dr. D. Worten, Pawhuska: I would like to ask what solution of alcohol do you use, glycerine or water?

Dr. Thompson: Water.

Dr. A. L. Guthrie, Oklahoma City: In regard to one part of the treatment, the doctor spoke of nasal or post-nasal troubles. Just what he means by active treatment, I don't know. Whether to use strong solutions during these attacks, I don't know, but I do believe in all these acute cases that the nasal cavity and the postnasal cavity should be thoroughly swabbed. The nasal cavity should be treated to prevent reinfections, or in other words, not strictly speaking, reinfections, but latent infections. I believe that hot irrigations or hot water should be used in the case of acute otitis media, through some small tube, so that it will get the effects of the heat more than the irrigation. I believe that boracic acid is best because pus is more soluble by boracic acid than anything else.

The treatment of mastoids is a very interesting subject to me and I differ considerably in the treatment of mastoiditis from some others. I believe in operating very soon. I have a case in mind now, say where it has gotten pretty far along. If that doesn't respond to ice packs in 24 to 36 hours, I am going to open that mastoid or somebody else is going to get the patient. I believe in early operations for the mastoid.

Dr. E. A. Abernathy, Altus: It is a very interesting paper and is a question with which we are confronted every day. My experience has been with them, the main thing to do is to have proper drainage. Another trouble we have is that the general practitioner sees them first and he uses laudanum and other things before we get them, and gets them in bad shape before the specialist sees them. If we get it early, and get the proper drainage, my experience has been we will not have any trouble at all. Dr. Guthrie spoke about the operation for mastoiditis and rather insists on that. I would not be quite so particular as he, because in a number of cases this season I have seen so many that looked like they ought to be operated on but were not and the result was a complete recovery with no bad results. Dr. Rutland was in a case with me a few weeks ago. It

was my brother. I would have operated on him if he had not been a weak man. After a few weeks it cleared up entirely.

Dr. L. M. Westfall, Oklahoma City: There is no argument about opening a bulging drum. I have seen a number of cases in which the drum was decidedly inflamed and I could not see any bulging whatever, and the pain was intense. I have opened several drums, and after the immediate pain subsided they got relief. Perhaps because it let the air into the middle ear. I believe I have been fairly successful in the use of benzol. It burns terriffically for about thirty seconds, but it is splendid.

Dr. H. C. Todd, Oklahoma City: I want to express my appreciation for this paper. It is very timely, to say the least, since we have all been having a good deal of ear trouble to contend with in our practices. If you will pardon me, I want to say a few words regarding the discussion. The paper is so complete that I have nothing to offer specially regarding it.

The question of douching the ear is one that has given me a good deal of thought as to the advisability of trying to syringe the pus from the ear. I believe it was Stewart Lowe of London who made the remark in my presence that in his opinion we never gain anything by using the douche in the ear to remove pus. I am thoroughly convinced that Dr. Lowe is right. I think if those of you who douche the ear will just take notice, you will see how thoroughly you fail to clean out an ear after douching it. I think, moreover, that you take a chance on spreading the infection. I have made it a practice for ten years never to douche an ear for purulent otitis media. The pus is usually thick and difficult to remove and difficult to clean out, but it can be cleaned up very nicely. I think a great mistake is made in trying to wash the pus out of an infected ear.

Regarding the mastoid case especially reported by Dr. Newton. I should be very sorry to keep that patient without operation in view of the fact that a simple mastoid operation is not serious. What relief is to be given by sitting quietly by and waiting—in view of the fact that such grave complications may be present in many of these cases? I am speaking from a little bit of experience when I say this, because I recall that about four or five years ago (when I was perhaps a little more conservative along these lines), a young man of a good deal of promise came to my office with symptoms similar to those stated by Dr. Newton. I waited until he developed labyrinthine troubles which resulted in the death of that young man. What is the use in postponing the operation when serious symptoms present themselves? None whatsoever, so far as I can see.

It is a very interesting paper, and one which concerns all of us. I appreciate the fullness whith which Dr. Cook has presented the subject.

Dr. E. S. Ferguson, Oklahoma City: We all have our opinions about these cases and every man who treats them probably treats them in a different way. In the first place, it is always a question as to when you have a case confined to the middle ear and when it goes beyond the direct line and becomes a mastoid. I cannot agree that a tender mastoid ought to be opened. I cannot agree that mastoid operation is a simple procedure. I don't care how simple the operation is, I have never seen a case of acute mastoid trouble without tenderness of the mastoid, and I have never seen diseased middle ear without a tender mastoid. You go up from the periosteal region and I believe that an acute middle ear trouble will get well ninety-five cases out of a hundred with proper treatment.

There are always questions that come up with diagnosis, and particularly as to the typical mastoid. You might wait a long time in some cases. I am not going to say that it is not the case with those of us who wait. I have seen, I suppose, as many acute middle ear cases in the practice of otology as the average. I have operated on one mastoid this year. I have seen a dozen cases that I probably could have operated on and probably would be upheld by a number of men who would feel that it was perfectly justified. I have had one other case where I thought

I probably should have operated, and the day that I told the parents that it probably should be operated, the patient got well without any further trouble. I do believe that we ought to be careful and to let these cases extend beyond a certain limit. But the fact that the mastoid is tender is not sufficient reason for opening it.

The question of whether to use irrigation is one that has puzzled me a great deal. For a number of years I used irrigations and for a number of years I have not used them. I believe they get along better without irritation.

Dr. H. C. Todd: You will find it extremely difficult to wash that pus out of the auditory canal.

Dr. E. S. Ferguson: I have gotten apparently good results from irrigation, but I believe I get better results without irrigation. It has been my experience that my patients have done as well without irrigation.

Dr. W. E. Dixon, Oklahoma City: I operated on a case the other day. It is a mere matter of putting the hole in. It was full of pus and it was a mere matter of opening up the cortex. In that case it ran along and did not get well and the operation seemed the only thing. Dr. Ferguson expressed my opinion in operating on the mastoid. I have seen a number of these cases and have operated on some, but there are cases where you detect a tenderness in over the mastoid, not only right back of the auricle or center portion, but down the neck. In ninety-five per cent of these cases they will get well without operation.

Dr. A. W. Roth, Tulsa: I want to say a word on that Victor apparatus. It has a fibre tip and is constructed so that it keeps the air hot. You can heat it and then disconnect it, and still have the air as hot as you want it.

As regards otitis media, we have a good deal of it here in our country. I have had to operate three cases this year for mastoid so far, but I have had some very severe cases of acute otitis media where it seemed almost necessary to operate, and one young fellow whose condition continued for a number of days, and yet with the ice and with the irrigations in there and with the dry treatment, too, resulted favorably. The only thing is with the mastoid treatment you begin a long series of treatments and you are going to have your patient on your hands a long time, and if you can spare them the long treatment and also the perforation of the drum by allowing them to suffer just a little longer and using some ice and some local treament to the membrane, you are doing more service than to rush in and operate.

I believe that just as soon as you have had an opportunity to observe these cases there should be a paracentesis and a good one, but in most cases I believe in waiting some time before operating.

Dr. D. D. McHenry, Oklahoma City: I believe if it is a rule to discuss the discussion, I would like to say a word or two. I think the case outlined by Dr. Newton of the sagging of the mastoid, is certainly a case for operation, but there are two or three things which it seems to me we should take into consideration before operating.

First, is the type of infection such that we ought not to put off the operation? —and a great number of our emergency cases are of this sort.

Another excellent point is your white blood count, especially in the adult. If you have a white blood count, about 15,000, it is a pretty good thing to go into that mastoid. I had two severe otitis media cases: one had a white blood count of 22,000 and got well without the mastoid nicely; the other one 12,000, and when we got him on the table we questioned whether he would stand the operation, and found just pus in the mastoid, and very little granulation. The sagging antrum does not mean that we have pus back in the antrum. I have seen a few of those otitis media cases this year and have done three mastoid operations. I have had several others where there has been a tenderness and have had only

a few where there is a sagging. I believe a good many of these can be gotten well without operation.

There is little danger to life, but the delay of a day or so makes the acute mastoid so very painful, at least all of my patients have complained of that, that I think we should avoid it if we can.

The other thing that I want to mention is suction. I find that a little suction increases the drainage. I believe that drainage is a thing we must have. It helps to keep the wound open. This question of irrigation has been a kind of joke because of the position taken by two or three of our men along this line. However, I see that one of them has changed his tactics. If you have once made it, and made it asceptically, I don't think it should be made as the average mother makes the irrigation when there are no postnares applications. I certainly endorse the strong postnares application. Personally, I haven't seen much results from the strong postnares application. I do not believe in the so-called radical treatments.

Dr. Cook, closing: This discussion has certainly been very interesting. The discussion of the paper has been rather limited but the discussions of the discussion have practically taken all the ginger out of the discussion that I wanted to discuss. One or two points were not made exactly clear. In the matter of suction—if the ear is wiped out thoroughly, I find you will get the drainage. I prefer the carbolic to the alcohol on account of the irritation and pain that the alcohol sets up.

The mastoid discussion I think we have had too much of already. I think it is a good idea not to bring up the tonsils and mastoid when we are considering acute otitis media.

MUSCLE GRAFTING

J. J. Nutt, New York, (*Journal A. M. A.*, Dec. 22, 1917), reports a study udertaken to determine whether function can be returned to a paralyzed muscle from poliomyelitis through the growth into it of the nerves from a neighboring sound muscle. He proposed to try splitting the sheaths of both the normal and the paralyzed muscles, scarifying the fibers so as to remove all obstruction offered by the sarcolemma to the growth and extension of nerves and then suturing the open surfaces of the two muscles. In one or two instances it has been his experience, and probably that of others as well, that after transplanting sound muscles to take on the function of the paralyzed muscles, notably after transplantation of the biceps to do the work of the paralyzed quadriceps, there has followed some return of power to the paralyzed muscle, possibly as a result of unintentional muscle grafting. The writer reports instances found in the literature. By experimenting on dogs he has sought to inform himself regarding the changes that occur after muscle grafting. He gives illustrations of the results obtained and reports his operations of this kind on patients in the State Hospital for the Care of Crippled and Deformed Children—sixteen in all. In conclusion, he says, "In four of them (the sixteen patients operated on), two paralyzed muscles each were operated on, making a total of twenty muscle graftings. Seven were complete failures, although one of these was opearted on as recently as July 27 and may yet prove to be of some value. Six patients show aslight return of power, which, however, is by no means sufficient to be of functional use. This slight power, as we know from similar results in muscle transplantation, may add to the strength of the joint and thus be of some benefit. Four cases have given fair results and three good results. The last seven cases give us the courage to report our work at this time, although we fully realize that much more will have to be done in both the laboratory and the clinic before the operation should be either unconditionally accepted or discarded."

IRIDOCYCLITIS DUE TO FOCAL INFECTION FROM A TOOTH*

Report of Case

By L. M. WESTFALL, M. D., Oklahoma City, Oklahoma.

To know a man thoroughly is to like him better, or to dislike him more. An extended acquaintance will bring forth qualities which we did not know he possessed. In the event that we find that his power is wielded for evil rather than good, we have him classified and are in a better position to cope with him. A superficial acquaintance with an individual does not bring out either his good or bad qualities.

So it is with infection. Not so long ago we were compelled in many cases to surmise the cause of conditions found. We were satisfied in a way, because we did not know of the possibilities that lay beneath the surface.

Focal infection, as related to the mouth and accessory structures, has only recently received the consideration that it deserves. During the tonsil and tooth crusade, no doubt some normal tonsils and teeth have been removed, nevertheless, the good that has been done by the removal of these diseased structures by far overshadows the injustice of the needless surgery.

Practically every movement during the course of its construction is likely to lose its equilibrium and is compelled to go through the "fad" or "hobby" stage. However, if the proposition has merit, it will eventually reach its proper level and serve its purpose.

This is true of medicine and surgery, as well as other lines. Hence when we are considering focal infections of the mouth, we may be inclined to believe that here lies the real cause of all the ills that the human may be heir to. This is not true, but the percentage of ills, directly traceable to primary infection of structures above the collar bone, is surprising to say the least.

The greater responsibility of detecting these points of infection lies with the oculist and aurist and dentist, the reason for which is self-evident. There are many diseases directly due to mouth infections which concern the general physician and surgeon, but it is not my purpose to discuss this phase of the subject. Reasonable care in the examination of these structures will bring its own reward. The X-ray is exceedingly useful in the obscure cases and without it, many focal infections would never be discovered.

In noting the various eye diseases which have been ascribed to mouth infections, the list includes practically every type of inflammatory and reflex condition with which we are familiar.

Eye diseases of secondary production to mouth infection occur in one of three ways: by bacteria or their toxines, reflex irritation, or a combination of both.

Many theories have been advanced to explain the mechanism of secondary involvement of the eye. Different observers have given as the course of the extension, venous, osseous, subperiosteal canals, perineural canals and the arterial system. Since the lymphatics of the mouth drain into the mandibular and cervical glands, this route may be eliminated. The most plausible course of extension would seem to be through the venous channels directly and the general arterial system indirectly.

Why organisms and their products, whose habitat is the mouth, should travel through the general blood stream and finally infect the eye, is questionable. If we accept the selective action theory, and this has been rather well proven by animal experimentation, that organisms of a given habitat, do have a special affinity for certain structures in other parts of the body, then the question is answered.

The following case, which is perhaps unusual in its severity and results obtained, illustrates very clearly what we may expect from infections of the mouth:

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*Read before the Oklahoma Stare Medical Association, Lawton, Oklahmoa, May 9, 1917.

E. S. M. Age 33. Family history negative. Personal history: gonorrhea several times. No history of syphilis. Had rheumatism for the first time about eight years ago and for five years the pain was constant. Three years ago the patient took a vaccine treatment which relieved the pain but swelling from the knees down remained.

About the middle of December, 1916, patient noticed that the left eye was somewhat red and gave him some discomfort, but no actual pain. During the next two weeks the eye became redder and developed moderate pain in the eyeball and over the brow. Vision had steadily grown dimmer so that by the time two weeks had elapsed, the eye was blind. Had bare light perception.

Examination showed the conjuctiva violently injected, with small vessels encroaching on the cornea. Cornea somewhat clouded. Iris contracted and muddy discoloration.

The light on attempted opthhalmoscopic examination produced profuse lacrhymation. Media very cloudy and eye-ground could not be seen. Instillation of atropin produced an irregular pupil, but in time complete mydriasis resulted. Pain during this time was intense, and light perception gone.

In the belief that this intense inflammatory condition was probably due to the same infection that was responsible for the rheumatic condition, a search was made for the focus. The nose, throat and teeth seemed to be negative. The patient was sent to Dr. J. R. Caughron for an X-ray picture of the teeth. The upper teeth all proved sound. The left lower third molar showed a decayed root. The patient was advised to have this tooth extracted. In the meantime he was seen by an oculist of unquestioned ability who advised the immediate enucleation of the affected eye, I am told.

The tooth was extracted, during which time the greatest pain was felt in the eye. The patient stated that each time the root was touched, it produced extreme pain in the eye. Two hours after this the pain had subsided sufficiently for the patient to sleep without any opiate.

The results from this extraction were almost immediate. The inflammation began to subside and three days later moving objects were perceptible. In a week vision was 20-100. In two months vision was 20-20 and has remained so since.

This man has had no return of his trouble except that recently rheumatic pains in the feet have bothered some. Examination of the mouth at this time shows a decayed tooth which may be responsible for this. Have examined the fundus of this eye several times since the inflammatory trouble subsided and found it normal.

Discussion

Dr. M. K. Thompson, Muskogee: This has been a very interesting paper from the fact that we have all seen a good deal of this focal infection and have had cases that would go on from month to month and go from oculist to oculist and finally would have to be turned over to the dentist. I have in mind one case, a doctor's wife, who had persistent headaches for years. She had muscular imbalance, requiring a prismatic curve to give her any relief whatever, and after an X-ray was made of the tooth showing a number of blind abscesses which were drained, eventually she got relief entirely from that and could leave off her glasses and had no headaches. We have seen numbers and numbers of these cases, so we look for these conditions daily now. When we have cases which show a condition that is hard to determine upon the face of superfical examinations, we go deeper and look for cases of focal infection. We find them frequently in the tonsils and we look for that trouble quite often, but most usually the trouble is outside of the eye trouble. So that it is necessary not only for us to work along our chosen line of profession but also to call in these specialists in other lines.

We have all enjoyed this paper. It is only recently that these focal infections have been recognized so completely. There is not only just the one point of infection. You may have tonsillar conditions; may have the turbinates very much engorged, which makes it very hard sometimes to say just what is to be done. You follow along one line and find that you have to take up another. Just day before yesterday a patient from out of town came to my offlce with the history of having had trouble for years. She had been to Mayos', and they said it was sinus troubles, and coming off here I hardly had time to diagnose the case thoroughly; but there is a little trouble in the sinus; however, it doesn't seem sufficent to produce the eye trouble she has. We are going to have an X-ray made of the tooth. There was some trouble with the tonsils. I am surprised that the Mayos didn't extract the tonsils. They said they would do that a little later on. If we do not find some abscesses on the tooth, I am going to insist on the tonsils coming out.

We find it is very difficult sometimes to look after these troubles alone and often have to call in help. I have two dentists next door with X-ray machines, and I think we are going to have to call in their help more and more.

Dr. W. H. Rutland, Altus: The case to which I refer is a school girl about 12 years old. She seemed to have had no trouble with her eyes until just recently and she came in on account of her failing sight; I looked her over and could not see anything unusual about the fundus or cornea, but her vision was about 20-70 in each eye; I examined her all over the best I could and did not find anything except a very much enlarged condition of the tonsils or the adenoids, and told the mother that I did not see anything else, but we would remove these with the hope that it would do the eyes good. She improved rapidly and in a month's time the vision had improved down to about 20-40 and now it is about 20-25.

Dr. W. Albert Cook, Tulsa: I do not know that I have anything to add to what has been said. I feel that it is coming into the limelight more and more all the time. These matters are very complicated. With so many local troubles we commence to look for the constitutional cause. By watching we can often find it. After everything else is eliminated, you decide that the trouble is possible rheumatism, and you take out the tonsils. If that does not prove to be the trouble, you then decide that the trouble is in a tooth; an infection will start there, and it takes some skilful work with the X-ray to locate these diseases, because I have had some cases that proved to be diseases where the X-ray did not demonstrate it. My imagination is not good enough to see all these cases that are pointed out by the X-ray. I believe we will find a great many more cases than we have heretofore found when we get more acquainted with the work.

Dr. J. H. Barnes, Enid: Mr. Chairman, this is a very interesting subject, "Focal Infection from the Teeth." I want to emphasize the kind of teeth in which we usually find these focal infections. In the first place, we should examine the teeth in all these cases where we have cyclitis. We will find that very often there we will have a history of syphilis. We will find this in a case of ureteritis. I have looked into this trouble with teeth with a dentist who has an apparatus and we have found where a nerve has been taken out and ground that that tooth is more apt to cause trouble. It is very seldom that a tooth with a live nerve will affect the situation. It seems that as long as the nerve is alive that the system —the local point—is able to take care of all the infection, but just as soon as that nerve is devitalized and removed, then is when we begin to have trouble. Another form that we have is pyorrhea. That is very common among our patients and we can get enough absorption in pyorrhea. If I should report one case, I could report several cases, of pyorrhea where the treatment was pushed to the limit because the patient refused to have the teeth cleaned up. These are the two main points, crowned teeth and pyorrhea, where we get the trouble.

One more thing with reference to taking X-rays of these. That is, they are very deceptive. Dentists have so many cases of that that they are skeptical

and we should take them into our confidence and in having an X-ray made we should have someone who is not only expert in making the X-rays, taking and developing them, but we should have a man who is as interested in the work as we are and will study the case with us, and these men should have one position in which to take certain teeth, and that same tooth should be taken in that same position every time he takes an X-ray of it, and go through a regular routine in making an X-ray of a certain tooth—that they should be taken in the same position every time. Now we find that our men will not do that. The X-ray will take them first one way and then another. If we have a man who will take an interest in that work and take a picture the same way every time, we can read them much better and then the X-ray man will be able to help us out much better and we will be able to save some teeth that are causing the trouble.

Dr. W. E. Dixon, Oklahoma City: While attending the lecture of one of the good men of the East, the doctor made the statement that often it is necessary to pull good teeth with no pain at all—and that is fallacious. A lady had rheumatism and she had her tonsils removed. They perhaps had left a piece of that tonsil. The doctor sent her to my office. I tried each one of the teeth—no cavities, but I insisted that she have anX-ray made. Four of those teeth were pulled and immediately she got relief.

Another case where following two weeks after some tonsil work a man, as he expressed it, had some nerves removed. He would go to one doctor and then to another. Each told him, "Yes, I can fix that." Finally he got on the train and was going to Mayos' and he was switched at Kansas City; there he went to a nose man, and then to a dentist, and finally came to my office for a nose operation. I insisted on his having an X-ray of his teeth, and I sent him to Dr. Caughron. We had the X-ray and pulled some teeth, and finally he came to my office with no results. I insisted that the place had not healed up, and he subsequently got relief when the operation was finally over and healed.

Focal infection is an interesting subject. Where it leads to we do not know. I think of an instance of skin trouble. I always call most skin troubles eczema. A skin man asked me to remove the tonsils of a child three years old. We did so and in ten days that child came to my office with the skin cleaned up.

During my absence last summer, Dr. McHenry had a case where a man had psoriasis of long standing. He removed the tonsils and afterwards the man told me that Dr. McHenry was a good skin specialist and that he had not had psoriasis for a long time.

Another case of skin trouble by removal of tonsils. A lady had been operated on and after she had dieted and her weight was gone, she had her tonsils removed and the focal infection removed. She got cleaned up. Ninety per cent of the people who die, do so from infection above the neck, and lots of it is focal infection. We do not know where the beginning is or the end is.

I enjoyed the paper, doctor, very much. I think it was a good one.

Dr. Westfall; closing: The subject of focal infection is such a broad one that when we start the subject we do not know where the end will be. Not all of the cases of focal infection are as simple as the one I reported. In fact, if we find one infection we may think the trouble is ended; but after that we find other causes which will cause reflex troubles. In many of these cases, perhaps, the failure to get results is due to the fact that we have not removed all the trouble.

IS THE MIDDLE TURBINATE BONE ESSENTIAL?

By L. C. KUYRKENDALL, M. D., McAlester, Oklahoma.

For the last three or four years my attention has been called to some phases of the treatment of the middle turbinate bone at the hands of rhinologists, as well as general practitioners. After what I have seen and comparing patients' experiences with my own, this thought came to my mind: Is the middle turbinate bone essential? I say it is, and the purpose of my paper is to try and prove to those who are of the opposite opinion that my theory is right.

When man was created, each bone, muscle, and organ placed in his body was without question placed there for a specific function or purpose, although in some instances this function has not been worked out; nevertheless, there is a function for that organ to perform, and when I say that the middle turbinate bone is essential, it is because it has a function to perform and it was not intended that it should be so wantonly sacrificed as I have observed from some operators.

In the submucous tissue of the membrane covering the inferior and middle turbinate bone, are venous plexuses which are known as the erectile tissue of the nose or "swell bodies." This erectile tissue is placed on the posterior ends of the middle and inferior turbinate bones and the inferior border of the inferior turbinate bone, and is placed there for the purpose of warming the inspired air, and regulating the amount of serous secretion. This is important because the lower respiratory tract does not secrete enough moisture for protective purposes, nor is it capable of warming the inspired air up to the body temperature without injuring its mucous membrane, therefore it stands to reason that the humidifying and heating portion of the nose must be in good physiological condition.

The sensory nerve supply of the turbinates are branches from the spheno-palatine ganglion. The hard and soft palates are supplied also from this ganglion.

The vessels of the mucous membrane and erectile tissue of the turbinate bone are supplied with vas-motor branches from the spheno-palatine ganglion. These are under the direct control of the vaso-motor centers of the medulla.

Asthma, when caused by reflex action coming from the nose, is caused by inflammation or other disease in the region of the distribution of the accessory nerves, especially the branches from the spheno-palatine ganglion. Asthma of nasal origin is caused also by the connection of association fibres (the connection between the vaso-motor branches of the spheno-palatine ganglion and the nuclei of the vagus), establishing between the upper and lower respiratory tract a physiological relationship. In this case it is well then to look for nasal polypus or ethmoidal sinusitis. The extreme sensitiveness of these areas during an inflammmation or where the turbinate is pressing against the septum is explained by this extensive distribution of the accessory nerve.

In rare cases the olfactory nerve extends down over the upper and median surfaces of the middle turbinate bone. The functions of the nose are olfactory, phonatory, respiratory, gustatory, and the ventilation of the nasal accessory sinuses.

If, as stated above, the olfactory nerve extends down over the median surface of the middle turbinate, it would be a very easy matter to lessen the acuity of olfaction through the removal of this bone. Don't understand me for one moment as being opposed to amputation of the middle turbinate bone, because I am not, but the plea I wish to make is more conservative surgery of this particular bone and your patients will not suffer the inconveniences I have witnessed, as well as experienced in my own case. Surgery as regards our particular line is assuming more and more the conservative and the day of radical has very nearly passed. I trust none of you are in the same class as a gentleman of this state who openly boasts of the number of turbinates he has removed. When such is the case,

*Read before the Oklahoma State Medical Association, Medicine Park, May 9, 1917.

I think of the man who boasts of the number of appendicitis operations he has had in the last year, and I am prone to think possibly some of it was unnecessary.

There are indications for the removal of the middle turbinate bone, and when they are present, remove it. But be careful to take off only enough to accomplish the desired results; the success of your operation will depend upon your knowing when to stop. On the other hand, do not subject your patient to unnecessary operations, as one physician I know has done, in that he would cut off a small portion of the mucuos membrane and wait a few days and repeat the process, until he had done this as many as ten or twelve times, each time charging for an operation, which made the bill much larger than it would have been had it all been done at once. That may be good business, but to my way of thinking it is not easy on the patient from a physical or financial standpoint, nor is it good medical practice.

In amputating or removing the turbinate bone, care should always be taken in order not to destroy or injure the swell bodies, because of the important function of these bodies. When there is indiscriminate removal of the turbinate, you destroy the warmth and moisture apparatus of the inspired air which has to do with the production of certain changes which allows for the normal transfusion of oxygen and carbon dioxide through the walls of the air vesicles. Also your have removed that portion of your air filter which catches and collects the finer particles of the air that have escaped the nasal hairs.

If the vaso-motor nerves which regulate the erectile tissue are disturbed in their function, the preparation of the inspired air for the lower air tract is imperfectly formed and the lower air tract is then exposed to the irritating influene of the inspired air and the irritation of the lining mucosa and the endothelial cells which line the air vessels of the lungs may result in bronchitis, while the transfusion of the gases, oxygen and carbon dioxide, may be disturbed in the air vesicles. Also the patient may experience a sense of stuffiness of the nose, or of a foreign body, or he may complain of an unduly open nose, and too much air in the nose does the sinuses no good whatever, but on the other hand may do a very great deal of harm.

While a student in medical school, I was operated on by one of the best rhinologists in St. Louis, and as a result of this operation (on both sides), I experienced all of the symptoms as given above, in addition to losing my sense of smell to a very great extent for four or five years, and it was very annoying, I can assure you. I have observed the same thing in my own early cases and in cases coming to me after having been operated on by other men. All of these things have caused me to know the middle turbinate bone is essential.

ARTHRITIS

The following is the summary of an article based on 1,100 consecutive necropsies by H. C. Clark, Ancon, Canal Zone, in negro laborers in the Panama Canal Zone (*Journal A. M. A.*, Dec. 22, 1917): 1. Gross lesions of arthritis were found in 15.6 per cent of 1,100 consecutive necropsies and less than one per cent. of those showing the lesions were considered "arthritic suspects." 2. All but two of the persons showing arthritis were hard-working adults, belonging chiefly to the negro race. A chronic degenerative type of arthritis included 129 of the cases. while 43 cases were well acute types of arthritis or some ill-defined acute and chronic types combined. 3. Chronic vascular diseases, such as syphilis and arteriosclerosis, and employment at hard labor are considered important etiologic factors in the production of chronic degenerative arthritis. 4. The focal degenerative arthritis found at necropsy in young adults offers the gross pathologist, in the writer's opinion, some additional presumptive evidence of syphilis, and the application of the laboratory tests for the disease is indicated.

MEDICAL NOMENCLATURE

By HOWELL B. GWIN, A. M., M. D., Tulsa, Oklahoma.

(Written for the Journal of the Oklahoma State Medical Association.)

Some years ago, while pursuing the study of anatomy at the University of Louisville, my attention was arrested by the unscientific, puerile and often absurd namings that exist in our medical vocabulary. There appeared to be about sixty or seventy-five parts of the human body having the names of men; besides these, there are many indefinite and nondescript names, such as acetabulum, for which I would suggest the name of *octoform*. Some of these names have been displaced and others are doomed.

Misnomers occur, also, as regards both diseases and their remedies. It is a mark almost of mental imbecility to continue such names as Addison's, Bright's, Potts', Graves' disease, etc. Some of the names of this class are properly supplanted, such as chorea for St. Vitus' dance, and erysipelas for St. Anthony's fire. Again, as regards remedies, surgical and medicinal, note Colles' fracture, Cesarean section or Sanger's operation, Loreta's operation, Waldrop's operation and Warburg's tincture, Blaud's pills, Buckley's uterine tonic, Dover's powder, Epsom salts, rochelle salt, etc. As an interesting study, track this false nomenclature through your medical dictionary, catalogues, and literature.

Few things are well defined, more are proximately described, but many are whimsically denominted, e. g., electricity from the Greek word elektron; amber, an agent from which it is supposed to have been derived; and in medicine, calomel, derived from the combined stems of two Greek words, meaning beautiful black. While such names are arbitrary, they are now fixed and have the force of proper names given to persons. I shun the role of a mere "purist," a stickler for an impossible accuracy, but as science advances, definitions and names will become clearer and more satisfactory.

It is proper to state that besides the sciences embraced in medicine, these *lacunae* of speech characterize all other sciences. Such imperfections inhere in every human mind, which, according to Emerson, has its limitations.

> Defects through Nature's productions run,
> We have spots, and spots are on the sun.

As examples, in geology many names are geographical; in botany many are personal or fanciful, such as Fuschia, named after a man, and Nasturtium, meaning a twisted nose. Finally, I make mention of a proposal of a fictitious name made by the friends of the sweet-singing poet of Georgia, who proposes his name, Lanier, for the Southern songster of the woods called the "mocking bird." Appreciation of Lanier is one thing and the destruction of the name of this charming bird is quite another—a name, as I discovered last summer, given 300 years ago by Captain John Smith, the early settler in Virginia, as the "mock bird."

Let us, as far as possible, repudiate the false, annul the whimsical, and exalt the true in all speech and literature.

MYOSITIS PURULENTA ACUTA

Masanaka Terada, Tokyo, Japan, (*Journal A. M. A.*, Dec. 22, 1917), reports a case of myositis purulenta acuta occurring in the course of typhoid fever and affecting the upper arm muscles. The clinical history is apparently not complete but the patient seems to have died. The necropsy report was given, as well as the bacteriologic and pathologic findings, which justify the diagnosis. The onset was marked by chills and high fever, but the temperature gradually fell to normal in about a week. Soon it rose again and was accompanied by the myositis as a partila symptom of ageneral bacteremia.

JOURNAL OF THE OKLAHOMA STATE MEDICAL ASSOCIATION

VOLUME XI MUSKOGEE, OKLA., FEBRUARY, 1918 NUMBER 2

PUBLISHED MONTHLY AT MUSKOGEE, OKLA., UNDER DIRECTION OF THE COUNCIL

DR. CLAUDE A. THOMPSON, EDITOR-IN-CHIEF

ENTERED AT THE POST OFFICE AT MUSKOGEE, OKLAHOMA, AS SECOND CLASS MAIL MATTER, JULY 28, 1912

THIS IS THE OFFICIAL JOURNAL OF THE OKLAHOMA STATE MEDICAL ASSOCIATION. ALL COMMUNICATIONS SHOULD BE ADDRESSED TO THE JOURNAL OF THE OKLAHOMA STATE MEDICAL ASSOCIATION, 307-8 SURETY BUILDING, MUSKOGEE, OKLAHOMA.

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EDITORIAL

DO NOT ROCK THE BOAT.

Of all the interviews and opinions given out with reference to the conduct of the War, the advice of Oklahoma's trenchant Governor, Williams, strikes us as worthy of close attention. In a few words he pointed out the monumenal task confronting the Nation, that we had done very well, should of course try to do better, but above all, this was not the time for captious criticism.

The War Department has been severely censured for the deaths occurring from pneumonia and other infections at the contonments, and this criticism falls directly on the medical profession having charge of the men. We do not believe for a moment that anyone with an atom of fairness will question the splendid ability of most of the men in the Medical Reserve and their superb qualifications for handling their problems, but it is hardly fair to criticise them for deaths following that great destroyer, measles-pneumonia, when the men are in incomplete camps or contonments, with many of the necessities not yet installed to give them proper care. When they come fresh from all quarters of the country, bringing with them infections ,thanks to our fixed principles of allowing the individual all the unsanitary and unquarantined license he wishes in order not to infringe on his "personal liberties", when an unprecedented number suddenly sicken and the hospitals are utterly unable to even house them, much less furnish adequate nursing service—we contend it is utterly unfair to hold anyone now in the army in any capacity responsible for the situation.

We do hold, with the ready-tongued wife of some Army officer, "The people listened to much to Bryan, now they are paying for it". Unpreparedness for anything was the fixed creed of thousands of our people. Senators and Congressmen from many states openly opposed, in compliance with the wishes of their Socialistic and ignorantly unpatriotic constituency, any preparation for Army or Navy improvement. Now we are in a fix. The blame—well, we need not try to place it, that is an utter impossibility. It is to be found in the right of every man to say what he pleases about anything or everything, regardless of

his ability to handle the subject; in the low cunning of the cheap politician who wanted to "please the boys back in the Forks of the Creek" and appropriate money to build Bunkum Hollow a post office and make navigable Sawdust Creek instead of for the purpose of building guns to avenge the Lusitania or for properly outfitting our important National Guard; in the general tendency of the American people toward peaceful pursuits and their inability to see the potentialities of the struggle across the water, and of course in many other unusual conditions affecting our citizenship.

We cannot sit tamely by and allow aspersions to be cast on a noble profession on this account. We are better fitted to step into a uniform at once and take up multifarious military duties than probably any other profession, for the treatment of sick men is essentially the same under all conditions, but we insist we should at least have a place to put the sick man in and given an opportunity to render proper service before being unfairly censured.

A NOTE TO COUNTY SECRETARIES AND MEMBERS.

We feel it a duty to again call the attention of our county secretaries to the importance of collecting and remitting for all members during January. While every member has had his attention called to the necessity, if he would protect his interests, for paying dues during January, it is proverbial almost that our profession is careless bebyond belief in matters of business and in this particular it is not an exception.

The rule is that a man has the month of January to pay and if this little formality is neglected, even for a day, our Medical Defense committee has no discretionary powers to change the rule for the individual though the personal desire to do so is always very great, so it should be understood in advance that unless the dues of the member are in the hands of the State Secretary on the day the cause of the alleged malpractice occurs no defense can or will be properly made.

Our defense plan is so far working out excellently. Our members in trouble have already been largely assisted and are now being assisted by one of the ablest legal firms in the State and there seems to be no question that the number of these usually unfounded suits is decreasing. It is believed that as the individual physician realizes that he is a member of one of God's greatest professional brotherhoods, that hastily formed and expressed opinions, often not based on anything except wild hearsay, are usually the true cause of malpractice suits, they will almost totally cease to vex the tired and tried souls of the honest physician.

INDUSTRIAL COMMISSION DECISION REQUIRING SURGICAL OPERATION IN CERTAIN CASES

BEFORE THE STATE INDUSTRIAL COMMISSION OF THE STATE OF OKLAHOMA.

Pink Condren, Claimant,
vs. Claim No. 4110.
Prairie Oil & Gas Company, Respondent.
(October 22nd, 1917.)

SYLLABUS.

I.

Under Workman's Compensation Law of this state an injured employee will be required to submit to a surgical operation when it appears from the facts that the operation involves no serious risk of life or health or extraordinary suffering, and if, according to the best medical or surgical opinion, the operation offers a reasonable prospect of restoration or relief from the incapacity from which the employee is suffering, then he either must submit to the operation or release his employers from further compensation,

II.

Refusal of claimant to submit to operation tendered by respondent under the facts was an unreasonable refusal; compensation will be denied from Nov. 1st, 1917, until he accepts an operation tendered by respondent.

III.

Claimant is entitled to an award of $7.21 per week from January 10th, 1917, until November 1st, 1917, and until further orders of the Commisssion.

Prentice & Mason, Tulsa, Okla., Attorneys for Claimant.
James A. Carroll, Independence, Kansas, Attorney for Respondent.

OPINION BY JACKSON, COMMISSIONER: The conceded facts in this case are, that claimant recevied an accidental injury on December 27th, 1916, while in the employment of the respondent and in the course of his employment; that his daily wage was $2.50; that he stuck a pick in his foot and is disabled from doing manual labor.

Respondent denies that his injury at this time is caused by the accident but that his continued incapacity for work is the result of his unreasonable refusal to submit to an operation.

Respondent tendered and offered claimant medical and hospital bill, and claim, if accepted, would relieve him of injury, and them from paying further compensation.

Claimant refused the operation on the grounds that he did not believe he would derive any benefit by having his foot operated upon. He admitted that since receiving the injury four pieces of bone had worked out of the wound. The respondent requested medical examination and by agreement claimant was to be examined by Dr. Fred Clinton of Tulsa, who was to examine claimant and report his findings to the commission. On October 1st, 1917, Dr. Clinton filed his report with the Commission, which reads as follows:

> "The injury and deformity are both permanent until corrected. The permanent disability will depend of course upon the injury to soft parts already sustained and the thoroughness with which correction may be made of the displaced broken bone.
>
> "Patient has sustained an open fracture of the metatarsal bone which has been followed by displacement of fragments, the upper of which is more marked. Fragments of bone are said to have worked out through this wound. Would suggest this wound be reopened and an effort made to bring the ends of the bones together and holding them there by such artificial aid as conditions would warrant after exposing them.
>
> "In my opinion, after careful examination, Mr. Pink Condron should be operated upon with a view of correcting or minimizing his present disability, and it is my opinion further, that such an operation involves no serious risk to life or health, and offers a reasonable prospect of relief or recovery from the incapacity from which he is now suffering."

The question for consideration is, whether or not the action of claimant in refusing an operation is reasonable. Upon a careful examination of the authorities we find that the general rule of law, both in England and this country, under Workmen's Compensation Law is, that the question of an employee's refusal to follow competent medical advice, and the reasonableness of his acts is a question of fact to be determined in each case by a careful inquiry into the circumstances surrounding same. The main question for consideration is, whether compensation will continue when it appears from the facts that the employee's attitude towards medical and surgical treatment is the cause of his continued incapacity. We find the law to be where an employee unreasonably refuses to submit to medical and surgical treatment, where the operation will be attended with no danger of life or health or extraordinary suffering, and the best medical or surgical opinion is that the operation offers a reasonable prospect of restoration or relief from the incapacity from which employee is suffering, then he must submit to an operation or further compensation will be denied. In support of this proposition we offer the following authorities:

The general rule of law as laid down by the courts, both in England and state courts, under Workmen's Compensation Law is that compensation will not be awarded an employee for incapacity caused by his own misconduct. It is generally held that where his attitude towards surgical or medical treatment continues or increases incapacity from an injury, the courts will refuse compensation where it appears from the facts that the employee unreasonably refuses to submit to medical or surgival treatment, and if the facts show that the refusal caused the disability to be prolonged or aggravated, the employer will be exempted from paying compensation.

Warncken v. Moreland & Son, Ltd., 100 Law Time 12, 2 B. W. C. C. 350, 1 K. B. 184.
Paddington Borough Council v. Stock, 2 B. W. C. C. 404.
Dosker's Manual Compensation Law, 236-239.

A collier injured the middle finger of one of his hands. His employers paid him compensation for a time, and then discontinued it because he refused to undergo an operation for the removal of part of his finger. He had undergone one unsuccessful operation on the finger to effect a union of a tendon. The unanimous medical testimony was that the operation was advisable, would cause no serious suffering or risk, and would restore his original capacity for work; HELD: that the man's refusal to submit to the operation was unreasonable; that this continued incapacity for work resulted from his unreasonable refusal and not from the accident; and that he was not, therefore, entitled to further compensation.

An employe must use ordinary care in treating his ailments, and failing to do so, the employer

cannot be held liable for increased disability because of such failure. In other words, increased disability occurring because the employee does not use ordinary care to cure and relieve his disability is not the proximate result of the accident, but is the result of an intervening agency, for which the employee, rather than the employer, must be held responsible.

Walsh v. Locke & Co., (Court of Appeal, England, January 22, 1914). (1914) W. C. & Ins. Rep. 98.

Negligence & Compensation Cases, 675. The court in handing down that opinion used the following language:

> "SIR SAMUEL EVANS, P. If I had not the assistance of other decisions there might be some difficulty in this case, but the principle of the law on this point has been well established by the case of Warncken v. R. Moreland & Son, Ltd. (1909), 1 K. B. 184; 78 L. J. K. B. 332; 100 L. J. 12; 25 J. L. R. 129; 53 Sol. J. 134; 2 B. W. C. C. 350, which discussed the whole principle and was a direct approval of the decision of the majority of the judges in Donnelly v. W. Baird & Co. Ltd. (1908) S. C. 536; 45 Sc. L. R. 394; 1 B. W. C. C. 95. In Warncken v. R. Moreland & Son, Ltd., supra, Cozens-Hardy, M. R., said: 'I desire respectfully to adopt the views of the majority of the Scotch judges in Donnelly v. W. Baird & Co., Ltd., supra, and, particularly, if I may so, the judgment of Lord M'Laren'; and Lord Justice Farwell said: 'Lord M'Laren in Donnelly v. W. Baird & Co., Ltd., supra, has expressed my view exactly. He says: 'There is of course no question of compelling the party to submit to an operation. The question is whether a party who declines to undergo what would be described by experts as a reasonable and safe operation is to be considered as a sufferer from the effect of an injury received in the course of his employment or whether his suffering and consequent inability to work at his trade ought not to be attributed to his voluntary action in declining to avail himself of reasonable surgical treatment.' The law as laid down by Warncken v. R. Moreland & Son, Ltd., supra, was also followed in Marshall v. Orient Steam Navigation Co., Ltd. (1910) 1 K. B. 79; 79 L. J. K. B. 204; 101 L. J. 584; 26 J. L. R. 70; 54 Sol. J. 64; 3 B. W. C. C. 15; where Cozens-Hardy, M. R., said: 'The true test is, whether the continued disability is due to the accident or to the man's unreasonableness in refusing to submit to the operation.' The question of unreasonableness is one of fact or, of inference from fact."

A claimant, under Workmen's Compensation Act, providing the amounts payable for the loss of a member shall also be payable for its permanent disability, is under duty to submit to an operation, if it will not cause unusual risk, and it fairly and reasonably appears that its result should be real and substantial physical gain in capacity to use the injured member.

Floocher v. Fidelity & Deposit Co. of Maryland, Supreme Judicial Court of Massachusetts, 221 Mass. 54, 108 N. E. 1032.

Honald's Workmen's Compensation, 521. *Dosker's Manual Compensation Law*, 236.

> "Where an injured employee refused to submit to an operation involving little danger or suffering, and which was not an experiment, the Industrial Accident Board erred in awarding compensation after the employer filed its petition to stop compensation until the claimant should submit to the operation, since, where a proposed operation is not dangerous and offers a reasonable prospect of restoration or relief from the incapacity from which a workman is suffering, he must must either submit or release his employers from the obligation to maintain him."

Kricinovich v. American Car & Foundry Co. (Michigan), 159 N. W. 362.

The question of unreasonableness is one of fact. Refusal to undergo a simple operation unattended by dangerous consequences to remove the cause of disability, contrary to advice of competent surgeons, is unreasonable conduct and bars the applicant from further compensation.

Where at the time of making the award it seems probable that an operation will be necessary to remove the disability, compensation may be allowed conditioned upon submission to operation at the proper time.

Gordon v. Evans, 1 Cal. Acc. Com., Dec., 1914.
Haley v. Hardenberg Miss. Co., 1 Cal. Ind. Acc. Com., 127.

Under the facts in this case and the rule of law followed in the foregoing authorities, we are of the opinion that claimant's refusal to submit to an operation on his foot was an unreasonable refusal. Therefore, claimant will not be allowed compensation during his continuance of such refusal of an operation. There is no doubt about claimant's disability and that he is entitled to compensation to the time the surgeon filed his report and a reasonable time to submit to an operation; and if the operation should be unsuccessful, the same compensation for his disability he would be entitled had the operation not been performed.

An award will therefore be made in favor of claimant for the sum of $7.21 per week to November 1st, 1917, and claimant will be required to submit to an operation at the expense of the respondent. Upon his failure to take the operation, respondent will be relieved from paying further compensation, the Commssion reserving the right to review and modify the award when circumstances require it.

McDonald, Chairman, and Williams, Commissioner, concur.

PERSONAL AND GENERAL NEWS

Dr. D. Y. McCary has moved from Calvin to Holdenville.

Dr. and Mrs. O. R. Gregg, Waynoka, announce the birth of a son.

Dr. J. W. Adams, Chandler, is "short" one Ford stolen from his garage recently.

Dr. and Mrs. W. D. Phillips, Maud, visited Louisiana friends during the hollidays.

Lieut. J. Hoy Sanford, Muskogee, has been ordered to report for duty at Ft. Riley.

Dr. E. A. Leisure, Fairland, spent December at the Mayo clinics Rochester, Minnesota.

Dr. C. E. Clymer, Oklahoma City, was slightly injured in an automobile accident Christmas day.

Dr. N. R. Nowlin, Oklahoma City, motored to Dallas, Texas with a party of friends for the holidays.

Lieut. Floyd E. Warterfield, M. R. C., Muskogee, has been ordered to report at Ft. Oglethorpe, Ga., for duty.

Dr. J. M. Byrum, Shawnee, entertained visiting Medical Reservists and Shawnee physicians Christmas day.

Lieut. W. W. Rucks, M. R. C., formerly of Guthrie, is recovering from an operation performed at Ft. Sam Houston.

Dr. C. V. Rice, Muskogee, who has been doing special work in pediatrics in Chicago for six months, has returned.

Captain Rex G. Bolend, Oklahoma City, has been ordered to Camp Travis where he will be attached to the Laboratory.

Drs. J. W. Baker and A. L. McInnis, Enid, have been appointed County and Assistant County Physicians of Garfield county.

Dr. James C. Johnston, McAlester, and Miss Muriel K. Everett of Watertown, N. Y., were married in the latter city December 20th.

Dr. James C. Johnston, McAlester, has been appointed a member of the Local Board for Pittsburg County vice Dr. W. C. Graves, resigned.

Dr. H. H. Wynne, Oklahoma City, is trying the simple life and starts out by moving to a country home near Oklahoma City where he will in the future reside.

First Lieut. C. M. Ming, M. R. C., Okmulgee, for some time stationed at Ft. Sill, has been ordered to Cornell where he will take special work in X-ray diagnosis.

Dr. and Mrs. G. W. Hinchee, Oklahoma City, announce the marriage of their daughter Jessie to Mr. James H. Williams of Enid. The ceremony was solemnized December 30th.

Dr. C. S. Petty, Guthrie, narrowly escaped death when his car was struck by a freight engine. He sustained a fracture of the nose and three ribs and was otherwise painfully bruised.

Dr. Ira Robertson, Henryetta, is suffering from many bruises as the result of his machine turning over an embankment and pinning him underneath. The accident occurred when the doctor attempted to turn aside in order not to frighten a team.

Dr. Rex. G. Bolend, M. R. C., Oklahoma City, takes a fling at the Oklahoma nurses in the charge that none of then are responding from his city to the call for nurses for Army work. Miss Edna F. Holland, Superintendent of University Hospital and State Chairman on nurses service, thinks that about all is being done that may be considering the requirements laid down.

The State Hospital, which when completed, it is said will be the largest in State and one of the largest in the southwest, will soon enter the realm of realities. The State Board of Affairs, Architects Dean Long and others charged with its construction, have adopted the plans and selected a site about one mile southeast of the capitol and in the northeastern part of Oklahoma City.

Dr. James G. Rafter, Muskogee, takes a very proper shot at his political enemies who alleged as a result of their request that he resign as City Physician, that he was giving too much time to the Local Exemption Board of which he has been a member since its organization. The Doctor thinks his humble services to the city should not be placed above his duties as a patriotic citizen to his nation.

Ottawa County Medical Society is on a protracted spree of regeneration and progressiveness. They are now meeting once weekly, the members attending lunch together and having a scientific session afterwards. On invitation from local physicians they change their meeting place to other towns in the county, the last meeting being held at Picher where the members attended the dedication of Picher's splendid new hospital. The subject for discussion was "Miner's Tuberculosis".

Drs. H. T. Ballantine and H. L. Scott, Muskogee, have been appointed City Superintendent and City Physician respectively vice Dr. John Reynolds, removed, and Dr. J. G. Rafter, resigned. The appointments come as the culmination of a long recrimnatory and nauseating contest between the Mayor and Dr. Reynolds, each charging that the other played politics, mismanaged affairs, etc. An interesting sidelight is thrown on the political game as applied to public health matters in the admission of Dr. Reynolds under oath in a recent ouster suit seeking to remove the Mayor, that there was a definite trade between he and the Mayor before the election as to the office and the statement of the Mayor that he had to appoint the Doctor in order to hold a member of the city commission to his side.

CORRESPONDENCE

REPORTING OF ACCIDENTS FROM LOCAL ANESTHETICS.

To the Editor:—The committee on Therapuetic Research of the Council on Pharmacy and Chemistry of the American Medical Association has undertaken a study of the accidents following the clinical use of local anesthetics, especially those following ordinary therapeutic doses. It is hoped that this study may lead to a better understanding of the cause of such accidents, and consequently to methods of avoiding them, or, at least, of treating them successfully when they occur.

It is becoming apparent that several of the local anesthetics, if not all of those in general use, are prone to cause death or symptoms of severe poisoning in a small percentage of those cases in which the dose used has been hitherto considered quite safe.

The infrequent occurrence of these accidents and their production by relatively small doses point to a peculiar hypersensitiveness on the part of those in whom the accidents occur. The data necessary for a study of these accidents are at present wholly insufficient, especially since the symptoms described in most of the cases are quite different from those commonly observed in animals even after the administration of toxic, but not fatal, doses.

Such accidents are seldom reported in detail in the medical literature, partly because physicians and dentists fear that they may be held to blame should they report them, partly, perhaps, because they have failed to appreciate the importance of the matter from the standpiont of the protection of the public.

It is evident that a broader view should prevail, and that physicians should be informed regarding the conditions under which such accidents accur in order that they may be avoided. It is also evident that the best protection against such unjust accusations, and the best means of preventing such accidents consist in the publication of careful detailed records when they have occurred, with the attending circumstances. These should be reported in the medical or dental journals when possible; but when for any reason, this seems undesirable, a confidential report may be filed with Dr. R. A. Hatcher, 414 East Twenty-Sixth Street, New York City, who has been appointed by the committee to collect this information.

If desired, such reports will be considered strictly confidential so far as the name of the patient and that of the medical attendant are concerned and such information will be used solely as a means of studying the problem of toxicity of this class of agents, unless permission is given to use the name.

All available facts, both public and private, should be included in these reports, but the following data are especially to be desired in those cases in which more detailed reports cannot be made.

The age, sex, and general history of the patient should be given in as great detail as possible. The state of the nervous system appears to be of especial importance. The dosage employed should be stated as accurately as possible; also the concentration of the solution employed, the site of the injection (whether intramuscular, perineural or strictly subcutaneous), and whether applied to the mouth, nose, or other part of the body. The possibility of an injection having been made into a small vein during intramuscular injection or into the gums should be considered. In such cases the action begins almost at once, that is, within a few seconds.

The previous condition of the heart and respiration should be reported if possible; and, of course, the effects of the drug on the heart and respiration, as well as the duration of the symptoms, should be recorded. If antidotes are employed, their nature and dosage should be stated, together with the character and time of appearance of the effects induced by the antidotes. It is important to state whether antidotes were administered orally, or by subcutaneous, intramuscular or intravenous injection, and the concentration in which such antidotes were used.

While such detailed information, together with any other available data, are desirable, it is not to be undersstood that the inability to supply such details should prevent the publication of reports of poisoning, however meager the data, so long as accuracy is observed.

The committee urges on all anesthetists, surgeons, physicians and dentists the making of such reports as a public duty; it asks that they read this appeal with especial attention of the character of observations desired.

Torald Sollmann, Chairman
R. A. Hatcher, Special Referee
Therapuetic Research Committee of the Council on Prarmacy and Chemistry of the American Medical Association.

MISCELLANEOUS

NEODIARSENOL.

E. P. Zeisler, Chicago, (*Journal A. M. A.*, Dec. 29, 1917), discusses a recent series of twenty intravenous injections of neodiarsenol, a recent substitute for neosalvarsan marketed by a Canadian firm, which he gave patients in all stages of syphilis. He observed an unusually large percentage of severe reactions, such as fever, headache, veritgo, vomiting, nausea, faintness, thoracic, oppression sometimes extremely alarming, at least it was in one case. On account of his unpleasant experiences in the use of neodiarsenol, he has ceased to use it and has since employed the French preparation, novarsenobenzol (Billon), which has given satisfaction.

BEWARE OF SWINDLERS.

No doubt you may have seen the several notices, under "General News," in the *Journal A. M. A.* in several recent issues, entitled "Once More a Warning." These refer to swindlers operating in different sections of the country—various letters having been received from victims in Ohio, Colorado and other widely separated states. Now comes a letter from the well known publishing house of W. B. Saunders Co. of Philadelphia, saying a man under the name of E. T. Rogers, claiming to represent the University Progressive Club of Cincinnati, for medical and other journals, has been victimizing physicians in Illinois; and the same subscription swindler, or another under the name of Robert Wayne, has been relieving physicians of their well earned cash in the region of Gary, Ind. It is believed there is a concerted action, perhaps by an organized band, being taken at this time of the year, to victimize physicians on so-called "subscription" schemes. Every physician should decline to pay any money by check, or otherwise, to subscription agents not personally known to him, or for whom other physicians cannot vouch. Many of these so-called agents operate under the guise of students "working their way through college."

AMERICAN VERONAL.

In the Trading with the Eenmy Act recently passed by Congress, provision was made for the licensing of American manufacturers by the Federal Trade Commission to produce articles and substances patented in this country by enemy aliens. Already a number of chemical manufacturers have taken advantage of this provision, among them The Abbott Laboratories of Chicago, which has applied for and secured a license for the manufacture of Veronal, which, however, will be known hereafter by the name BARBITAL. This is the official name given by the Federal Trade Commission, and this name must be used as the principal title by every firm manufacturing it under license from our Government.

The Abbott Laboratories have already begun the manufacture of Barbital (formerly known as Veronal), and we understand that in short time it expects to have an abundant supply of this well known hypnotic, and that it will be made generally available through the trade. The quality of the product is guaranteed. Indeed, before a license is granted for the manufacture of any of these patented synthetics in the United States, the product must be submitted to rigid investigation at the hands of a chemist designated by the Federal Trade Commission. In this way Americans are assured of supplies of the American-made products at reasonable prices, and the manufacturer of fine American chemicals is given the stimulus which it requires.

Those interested are urged to communicate with the Abbott Laboratories, Chicago.

NEW METHOD AT BATTLE CREEK

The so-called fractional method of gastric analysis advocated by Rehfuss has been found to have such advantages that it has been introduced in the Battle Creek Sanitarium, where tests meets to the number of thousands are given each year. To the patients, the new plan is vastly preferable. Indeed, the swallowing of what was often called "the garden hose" was attended in most cases by actual suffering and in many by severe pain. Under the fractional method, a very small tube is used. An oval tip, made of metal and perforated, makes the swallowing easy. Of course, it is unconvenient to have to sit for an hour and a half or two hours without removing the tube, but there is no real distress. The usual test meal of two slices of toast and a glass of water is given, at intervals of half an hour, a small specimin of the gastric juice, 10 or 16 c. c. is taken, until the acidity curve begins definitely to come down.

Under the old method, the practice was to take out all the gastric juice at the end of an hour. At Battle Creek, the period had been lenghtened to an hour and a quarter because this was found to be the usual time of greatest acidity. A comparison of the two methods shows that the original plan was misleading in many instances. Under that procedure, cases would be set down as normal if the acidity was shown to be at the usual percentage one hour after the meal. However, as the fractional method proves, many patients who have the right acidity at that minute, many have too little or too

much before and after the hour has passed. By studying the complete cycle of digestion, an accurate diagnosis may be made.

PNEUMOCOCCIC INFECTIONS.

C. C. Hartman and G. R. Lacy, Pittsburg (*Journal A. M. A.*, Dec. 29, 1917), publish a summary of their results in classifying pneumococci according to their biologic differences, using for the purpose the patients admitted from the Allegheny General Hospital and from Pittsburgh and its suburbs. Their technic was that used at the Rockefeller Institute and reported by Dochez and Gillespie, Cole, Avery, and others. The pneumococci were isolated from the sputum and blood cultures were taken when certain conditions, such as meningitis, lung abscess, etc., were present or developed. In several necropsies after pneumonia, cultures were taken from the lung and heart's blood and other accompanying lesions. The purpose of these various cultures was to determine whether pneumococci from various lesions in the body correspond with their biologic classification. Five of the patients of group I suffering from pneumonia were treated with a corresponding antiserum, two of them developing meningitis and receiving the antiserum, both intravenously and intrathecally. Blood cultures taken twenty-four hours later were positive three times in one case and twice in the other. Cultures of the spinal fluid after the serum was administered were also positive. Three of the patients treated recovered under the treatment. A table setting forth the incidence and mortality or pneumococci in 112 patients, including thirteen unclassified, suffering from strepococcic and other infections, gives a mortality of 23 per cent. for the unclassified group. If the unclassified cases are excluded and only those of the four groups of pneumococcus infection are included, the mortality is 35.3 per cent. The incidence of the various groups of pneumococci seem to agree closely with that observed by Cole. Details are given as to the culture findings of the various groups and localities. A recurrence and second infection occurred in two patients both in group I. The report shows that the incidence of the various groups of pneumococci occurs in a ratio similar to that of pneumonias generally. Those cases with positive blood cultures are more serious than the others. It would seem that most cases of meningitis are due to organisms of group I. Cultures taken from several sources in the patient invariably belong to one single group.

OSTEOPATHY IN THE ARMY.

There were 235 deaths in our training camps during the week of January 11. More than half of those—to be exact, 149—were due to pneumonia. As is well known, only practitioners of the old school of medicine are admitted to the army medical corps. The osteopaths, for example, are excluded. A bill is now before congress to admit osreopaths to examination for commissions in the army. And since osteopathy claims to treat pneumonia successfully, and can cite a fairly good record to substantiate that claim, it does seem as if this bill should be passed. For it is clear, from the figures given above, that the present treatment for pneumonia in our training camps is not successful.

No layman will presume to say that osteopathy could have prevented any one of those 149 deaths from pneumonia. That is not the point. The point is that osteopathy is recognized by public opinion and practice as a legitimate school of healing. The scope of its efficacy is steadily broadening. For example, it now maintains a sanitarium for the treatment of insanity where it is said to have had excellent results. It can lay an arresting hand on a vegrant vertebra and—presto! One's hay fever is only a sniffling memory. We haven't the slightest idea how osteopathy does those things, but it does them.

Now, if osteopathy can cope with pneumonia, the boys in our training camps are entitled to the benefit of that treatment. We all know how the so-called conventional school of medicine looks down upon every other branch or system of therapeutics. It might view with disfavor the advent of this newer school. There might be friction between the M. D. and the D. O. The public cares nothing about that. It has no concern at all with professional jealousies. It is vitally concerned with giving those boys in the training camps the best possible defence against all adversaries, whether germs or Germans. If osteopathy can help meet camp or trench requirements the army doors should be opened to it.—The Oklahoman.

We respectfully suggest that the writer of the above call on the Chiropractic, Christian Science, Naturopathic, Divine Healers and a few other of the especially well fitted schools of medicine to help us out of our grave National dilemma. Any one of the above claim, and, as logically too, to do all the osteopath does and more, so let's be fair and give them all an opportunity to save the day.—Ed.

IN FAVOR OF MEDICAL SUPERVISION.

Of course the Tulsa County Medical Society is in favor of medical supervision of the public schools. Did anybody ever know of a medical society that was not in favor of any supervision that could be attained, provided the money was forthcoming to pay for it? It was a foregone conclusion that the members of the society would be in favor of supervision of the schools and right away somebody estimated that it could be done at the trifling expense of $25,000 a year.

Medical inspection in the schools in most places simply provides a salary for a physician, who also adds to his income by his private practice. Then the position can be handed around among the physicians and it usually proves to be a good thing. The physician inspecting the schools makes the

rounds once a month. He looks over the children in a herd and to prove that he is working at the job requires a few of them to put out their tongues. He inspects them by merely looking at their bright faces. Mostly medical inspection in the schools is a farce, pure and simple. The little children themselves know it.

In addition there are persons in every city—parents, rather—who have advanced beyond the stage of taking medicine or having it given to their children. The regularly ordained and ethical physicians may contend that these parents have retrograded instead of having advanced, or that they are off on the wrong track, but the law recognizes practitioners of other cults to some extent. If they do not want medicine poured into their children by the medical inspector of the schools, they have the right to enter an objection.—Tulsa Democrat.

This classical piece of libel emanates as indicated from the Tulsa Democrat, a sheet odorously known by newspaper men generally, by quite a distinctive and humilating title not necessary here to mention. We do call attention to the fact that the article was written by one who is either grossly ignorant of what school inspection is or one who desires to purposely misstate the function of inspection. Inspection and taking or giving medicine have nothing in common, as every intelligent person knows. An ordinarily informed farmer knows today the value of inspection, not only of his children but of his cattle and nursery stock, his seeds, in fact of every form of life going to make for his prosperity and security. Inspection has for its sole object the discovery of incipient diseases in such time as will prevent the infection of other children. It is based on the common sense principle of law that no one must unnecessarilly expose another to his infections, as would be, and is the case in communities where inspection is not had in order to weed out the dangers.—Ed.

COUNCIL ON PHARMACY AND CHEMISTRY—REPORT IN PART.

NEW AND NONOFFICIAL REMEDIES.

Borcherdt's Malt Sugar.—A mixture containing approximately maltose, 87.40 per cent.; dextrin, 4.40 per cent.; protein, 4.35per cent.; ash, 1.90 per cent., and moistere, 1.95 per cent. It may be used when maltose is indicated in the feeding of infants, particularly in the treatment of constipation. The Borcherdt Malt Extract Co., Chicago. (*Journal A. M. A.*, December 1, 1917, p. 1875).

Tyramine Roche.—A brand of tyramine hydrochloride complying with the standards of New New and Nonofficial Remedies. The Hoffmann-LaRoche Chemical Works, New York, (*Journal A. M. A.*, December 1, 1917, p. 1875).

Atophan.—A proprietary brand of phenylcinchoninic acid complying with the standards of the U. S. P., but melting between 208 and 212 C. For a description of the actions, uses and dosage, see New and Nonofficial Remedies under Phenylcinchoninic Acid and Phenylcinchoninic Acid Derivatives. Atophan is sold in the form of pure atophan and atophan tablets 0.5 gm. Schering and Glatz, New York, (*Journal A. M. A.*, December 8, 1917, p. 1971).

Arsphenamine.—The Federal Trade Commission having adopted the name "arsphenamine" as the term to apply to 3-diamino-4-dihydroxy-1-arsenobenzene, first introduced as salvarsan, the Council on Pharmacy and Chemistry voted to adopt this abbreviated name in place of arsenphenolamine hydrochloride now in New and Nonofficial Remedies.

Arsenobenzol (Dermatological Research Laboratories).—A brand of arsphenamine. It has essentially the same actions, uses and dosage as Salvarsan. It is supplied in ampules containing, respectively, 0.4 gm. and 0.6 gm. Manufactured and sold by the Dermatological Research Laboratories, Philadelphia Polyclinic, Philadelphia, Pa.

Salvarsan.—A brand of arsphenamine. Supplied in 0.6 gm. ampules. Manufactured and sold by Farbwerke-Hoecsht Co., New York.

Chloramine-T.—Sodium paratoluenesulphochloramide. It has the actions, uses, dosage and physical and chemical propperties given in New and Nonofficial Remedies, 1917, for chlorazene.

Chloramine-T (Calco).—A brand of chloramine-T. Manufactured by the Calco Chemical Co., Bound Brook, N. J.

Novocaine.—The monohydrochloride of paraminobenzoyldiethylamino-ethanol. Actions, uses, and dosage, see New and Nonofficial Remedies, 1917, p. 31. Manufactured by Farbwerke-Hoechst Co., New York (*Journal A. M. A.*, December 22, 1917, p. 2115).

PROPAGANDA FOR REFORM.

Some Missbranded Mineral Waters.—Shipments of the following bottled mineral waters were seized by the Federal authorities, and on prosecution declared misbranded under the provisions of the U. S. Food and Drugs Act: (1) Baldwin Cayuga Mineral Water; (2) Bowden Lithia Water; (3) Carbonated Colfax Mineral Water; (4) Chippewa Natural Spring Water; (5) Crazy Mineral Water; (6) Crystal Lithium Springs Water; (7) Gray Mineral Water; (8) Henk Waukesha Mineral Spring Water; (9) Seawright Magnesian Lithia Water; (10) White Stone Lithia Water, and (11) Witter Springs Water. The "lithia" waters (Nos. 2, 6, 9, and 10) were in each case declared misbranded in that they did not contain sufficient lithium to warrant the term "lithia" in the name. A number (Nos. 1, 3, 5, 6 and

11) were declared adulterated in that they contained filthy or decomposed animal or vegetable substances of an excessive number of bacteria. Most of the waters (Nos. 1, 3, 4, 6, 7, 8, 9, and 10) were declared misbranded because the curative claims made for them were found unwarranred, false or fraudulent (*Journal A. M. A.*, December 1, 1917, p. 1901).

Salvarsan Manufacture Authorized in U. S. The Federal Trade Commission has granted orders for licenses to three firms to manufacture and sell arsphenamine, the product heretofore known under the trade name of salvarsan, patent rights to which have been held by German subjects. Provided conditions of the license are accepted by the firms, the following will be authorized to make and sell arsphenamine: Dermatological Research Laboratories of Philadelphia; Takamine Laboratory, Inc., of New York, and Herman A. Metz Laboratory of New York. The license stipulates that the name arsphenamine be used in connection with the trade name, that the product must be submitted to the U. S. Public Health Service for examination before sale, and reserves the right to fix the price. (*Jour. A. M.A.*, Dec. 8, 1917, p. 1989.

Anasarcin and Anademin. These are the twin nostrums of cardiac pseudotherapy. Cardiac disease with its resultant renal involvement is frequently encountered; and running, as it does, a chronic course, it offers an almost ideal field of exploitation for the typical nostrum vendor, who is more familiar with human credulity than with his preparation. Anademin is said to consist of apocynum, strophanthus and squill with elder—an irrational mixture of three heart drugs with inert elder. Anasarcin has been stated to contain sourwood, elder and squill. Anasarcin is a dangerous remedy in the hands of the average clinician, and its use is at all times to be condemned. In view of the dangers attending the incautious use of any member of the digitalis group of drugs, it is impossible to condemn sufficiently the recommendation that the use of Anasarcin should be continued without cessation until all symptoms of dropsy have disappeared. In the present state of our knowledge of cardiac drugs it is indisputable that digitalis and tincture of digitalis are best suited for the treatment of cardiac diseases except in those few cases in which intramuscular or intravenous administration must be employed temporarily for immediate effect (*Journal A. M. A.*, Dec. 8, 1917, p. 1992.)

The Carrel-Dakin Wound Treatment. From observations of the results of the treatment of wounds by the Carrel method, Wm. H. Welch is convinced that Carrel deserves credit for calling the attention of surgeons to the possibility of the sterilization of infected wounds by chemical means. The Carrel method actually accomplishes sterilization sufficiently for surgical purposes. The destruction of surface bacteria without injury to the body tissues is of primary importance (*Journal A. M. A.*, Dec. 8, 1917, p. 1994.(

Strandgard's T. B. Medicine. The resident physician of a Canadian sanatorium states that Dr. Strandgard's Medicine Company of Toronto, Canada, is attempting to sell its "consumption cure," called Strandgard's T. B. Medicine, to Canadian soldiers who are being treated at the sanatorium (*Journal A. M. A.*, Dec. 15, 1917, p. 2060.)

Pepto-Mangan. Physicians having served the purpose of popularizing it, Pepto-Mangan (Gude) is now advertised in newspapers. In consideration of the established facts in regard to the absorption of iron and its utilization, all possible excuse for the therapuetic employment of Pepto-Mangan, in place of iron, has vanished. False claims regarding the efficiency of the preparation have been circulated by its promoters, and about two years ago the Council on Pharmacy and Chemistry reported that while the statements were no longer made, they had never been definitely admitted to be erroneous by the Breitenbach Company, and that Pepto-Mangan was then being exploited to the public indirectly. From the reading of the present advertisement in a medical journal, one can only suppose that this was intended to mislead physicians. The physician who prescribes Pepto-Mangan as a hematinic shows ignorance of the most rudimentary facts of iron therapy, and the intelligent patient soon perceives his limitations. "Useful Drugs" contains a list of iron preparations that are suitable for all conditions that call for iron. William Hunter discusses the subject of anemia and its treament at considerable length in "Index of Treatment," Edition 6, p. 17-37, and gives many prescriptions containing ron for use under different conditions (*Journal A. M. A.*, Dec. 29, 1917, p. 2202).

NEW BOOKS

PRACTICAL MEDICINE SERIES—VOL. VII.

Obstetrics. Edited by Joseph B. Delee, A. M., M. D., Professor of Obstetrics, Northwestern University Medical School, with the Collaboration of Eugene Cary, B. S., M. D., Assistant Gynecologist, St. Lukes' Hospital; Instructor in Gynecology, Northwestern University Medical School. Series of 1917. Illustrated. 224 pages. Price $1.35. The year Book Publishers, 608 South Dearborn, Chicago.

PRACTICAL MEDICINE SERIES—VOL. VIII.

Pharmacology and Therapeutics. Edited by Bernard Fantus, M. S., M. D., Associate Professor of Medicine, Subdepartment of Therapeutics, Rush Medical College, Chiacgo, Ill.

Preventive Medicine. Edited by Wm. A. Evans, M. S., M. D., L. L. D., P. H. D., Professor of Preventive Medicine, Northwestern University Medical School. Series 1917. Illustrated. 384 pages. Price $1.50. The Year Book Publishers, 608 South Dearborn, Chicago.

TECHNIC OF THE CARREL METHOD.

Technic of the Irrigation Treatment of Wounds by the Carrel Method. By J. Dumas and Anne Carrel. Authorized Translation by Adrian V. S. Lambert, M. D., Acting Professor of Surgery in the College of Physicians and Surgeons (Columbia University), New York, with an introduction by W. W. Keen, M. D., L. L. D., F. A. C. S. Illustrated. 90 pages. Price $1.25. Paul B. Hoeber, 67-69 East 59th St., New York.

So much has recently been written descriptive of the Carrel method of wound treatment by the application of sodium hypochlorite solution, that it seems unnecessary to issue a monograph on the subject, but inasmuch as constant reiteration of what most of us understand to be the rule is necessary to get the best results from the greatest number of users, this issue is justifiable. The tenchic of application, with the necessary apparatus, the examination bacteriologically of secretions and other phases is discussed.

DISEASES OF THE HEART.

A Clinical Treatise for the General Practitioner. By Edward E. Cornwall, Ph. B., M. D., Attending Physician Willisamsburgh and Norwegian Hospitals; Consulting Physician, Bethany Dea-Hospital; Formerly Professor of Medicine, Brooklyn Post-Graduate Medical School; Fellow of the American College of Physicians, The American Congress on Internal Medicine, etc. Linen cover. Illustrated. 127 pages. Price $1.50. 1917. The Rebman Company, New York.

This book contains much indicative of the individuality of the author, is very readable and entertaining. The style is quite different from works usually issued and attracts the attention of the reader without effort. Considerable attention is devoted to the dietary, to heart stimulants, especially digitalis, strophanthin, strychnine, morphine, caffeine, etc. Attention is also directed to the general application of exercise, baths, bleeding, prophylaxis. The consideration of acute inflammatory heart conditions (infections secondary to other involvements) is very judicially administered and in such a manner as to be helpful to the general practitioner in the trying situations accompanying such complications. The uses of the strophanthus group is so nicely discussed we shall forgive the author for the statement that it is "more readily execrated" and assume he referred to the excretion of the drug.

TALKS ON OBSTETRICS.

By Rae Thornton La Vake, M. D., Instructor in Obstetrics, University of Minnesota, Obstetrician in charge of the Out-Patient Obstetric Department of the University of Minnesota, etc. Cloth. 157 pages. Price $1.00. 1917. C. V. Mosby Company, St. Louis.

The author frankly states this to be neither text book or compend but hopes it to stand as a frontispiece in the study of obstetrics. It is a discussion of the commoner phases of obstetrical practice and the complications met in such, interspersed with many suggestions from experience at the bedside. Sepsis, the toxemias of pregnancy and hemorrhage in obstetrics are given the leading place. Other Complications—heart lesions and tuberculosis, use of forceps, version ceserean section, etc., with many minor affairs are treated of.

GENITO-URINARY SURGERY AND VENEREAL DISEASES.

By Edward Martin, A. M., M. D., F. A. C. S.; John Rhea Barton, Professor of Surgery, University of Pennsylvania; Benjamin A. Thomas, A. M., M. D., F. A. C. S., Professor of Genito-Urinary Surgery in the Polyclinic Hospital and College for Graduates in Medicine, Instructor in Surgery, University of Pennsylvania, and Stirling W. Moorhead, M. D., F. A. C. S., Assistant Surgeon to the Howard Hospital, Philadelphia, Pa. Illustrated with 422 engravings and 21 colored plates. 10th editoin. Cloth. 929 pages. Price $7.00. 1917. Philadelphia and London, J. B. Lippincott Company.

This formidable work is to be properly termed a library on genito-urinary surgery and venereal diseases. The very profuse and applicable illustrations of operative procedure and technic render it an immensely valuable contribution to the literature and will doubly arm the physician interested in the subjects. The authors in searching for material descriptive of the rarer conditions have had access and used it freely, to that great storehouse of medical and surgical lore, the Philadelphia College of Physicians. Every condition incident to sexual life, its diseases and abnormalities is copiously noted, while the very important needs met in a wide range of work such as surgery of the prostate, bladder, kidney, testicles, cord, vesicles, urethra, both male and female, the ureters, nephrolithiasis, infections, tuberculosis and tumors is considered.

The portions devoted to syphilis contain more than 200 pages and consider all phases including the tried remedies, such as mercurials and arsenicals.

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